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XLVIII. *An Inquiry into the Value of the
ancient Greek and Roman Money: By
Matthew Raper, Esq; F. R. S.*

INTRODUCTION.

Read Dec. 5, 1771. **T**HE first writers, who, after the revival of learning in Europe, made the Greek and Roman money an object of their inquiries, took great pains to collect and explain such passages in antient authors as related to it; but very little to discover its true value. In so much, that some of them have supposed the Roman Aureus to have been heavier than the Greek Philippic (1); and others, that the Denarius was heavier than the Attic Drachm; but most of them agreed in this, that the two last mentioned coins were exactly equal. All which opinions are proved to be erroneous by the coins themselves now in being.

(1) See Gronovius, de pecunia vetere, l. ii. c. 8.

Our learned countryman John Greaves, was, I believe, the first who discovered that the Attic Drachm was heavier than the Denarius (2). He seems to have examined a greater number of Greek and Roman coins than any other writer on the subject. His balance turned with the 80th part of a grain (3); and his weights were correctly adjusted to the English standard (4), as appears from the comparison the Royal Society of London caused to be made, in the year 1742, of the Troy Ounce with that of Paris, which was found to agree precisely with what Greaves had so long before determined (5).

His care and diligence in weighing the coins, and his fidelity in reporting them, have never been doubted; but he is not always sufficiently explicit; as, where he says he had perused many hundred Denarii Consulares, and found the best of them to amount to 62 grains English (6); it is probable he found many such, for there are many of this weight and upwards in that noble repository the British Museum; but when he says in the same paragraph, that, weighing many Attic Tetradrachms, he found the best of them to be 268 grains, he may mean only one, for very few come up to that weight. Nor hath he given a particular description of this

(2) See the dedication of his Discourse of the Roman Foot and Denarius, printed in the year 1647, and reprinted, with other of his works, by Dr. Birch, in 1736. I quote the original edition, which contains 134 pages numbered after the dedication. That of Dr. Birch, begins at p. 181 (excluding the dedication), and ends at p. 356. (3) Ibid. (4) See his Discourse, P. 61.

(5) Philosophical Transactions, N^o 465. (6) p. 61.

heavy Tetradrachm, but seems to think the weight of that coin was in all ages the same, which probably it was not.

He allows that silver is more liable to be oversized at the mint than gold (7); yet he determines the weight of the Attic Drachm from the Tetradrachm to be 67 grains (8), though no gold coin, he ever saw, comes up to it by a quarter of a grain in the Drachm (9).

He hath likewise made his Denarius above half a grain heavier than any he had perused, to agree with Villalpandus's weight of the Congius (1); which led him to suppose, that the Roman Aureus was just double the weight of the Denarius (2), contrary to the express testimony of Pliny. And he hath not given a clear account of the Consular Aureus.

In the year 1708, John Caspar Eifenschmid, of Straßburg, published his book *de ponderibus & mensuris veterum, &c.* He is an accurate and a faithful writer, but wanted materials. He used Paris weights, which seem to have been correctly sized to that standard. Having seen no Roman gold older than the reign of Tiberius, which was not too imperfect to discover its original weight (3), and finding the most perfect Consular Denarii to be very unequally sized, he took a mean from a pretty large heap of such as he thought unexceptionably perfect, rejecting some, which, though apparently so, were

(7) P. 103. (8) P. 66. (9) P. 72.

(1) Compare p. 94 and 120, with p. 61. (2) P. 103.

(3) Eifenschmid, p. 34.

very deficient in weight, and thence determined the weight of the Confular Denarius to be $74\frac{2}{7}$ Paris grains, equal to $60\frac{1}{4}\frac{5}{8}$ Troy (4). But, as he hath not told us what number of pieces his large heap contained, nor the weight of the heaviest and lightest of them, his conclusion is not satisfactory.

Having no perfect Greek coins, either gold or silver, except one very ancient Attic Tetradrachm weighing 333 Paris grains, he derived the weight of the Attic Drachm from his Denarius, by a proportion between the Roman Pound and the Attic Talent, mentioned in the 38th book of Livy's History, which happened to agree with the weight of his ancient Tetradrachm, giving a Drachm of $83\frac{1}{4}$ Paris grains, equal to almost $68\frac{3}{4}$ Troy (5).

Neither he nor Greaves have taken notice of the Roman Scrupular gold coin, nor made such use of the Constantinopolitan Solidus, as might be expected, from the great number now remaining in the most perfect preservation, though the latter hath given the weights of 29 of them.

Greaves, very justly, observes, that, “ gold coins
“ are not subject to be consumed by time and rust,
“ but only *ex intertrimento*; and therefore we may
“ the safelier give credit to them. And because
“ the difference, though but of a grain, is of some
“ consideration in gold, the masters of the mint use
“ to be more circumspect about them: whereas, in
“ silver coins, since it is hardly worth the pains to
“ stand precisely on the excess or defect of a grain,
“ there are few of these so exact, but either exceed

(4) P. 33. (5) P. 40 and 42.

“ or want in the very mint one or two grains, and
 “ sometimes more (6).”

I found, the heaviest of twenty new guineas, of the year 1768, fresh from the mint, to outweigh the lightest $1\frac{2}{3}$ grains. The didrachmal gold of Philip and Alexander is about 4 grains heavier than our guinea; and I never found the difference between any two of them, that appeared to be perfect and unworn, amount to two grains. The silver, likewise, of these two Princes is more correctly sized, than any other ancient silver money I have seen.

The Roman Consular Aureus is between 3 and 4 grains lighter than a guinea, and is not so correctly sized as the Greek gold; but much more so than the Denarius, which is so unequal, that the Roman mint-masters seem to have contented themselves, with striking a certain number of pieces out of the pound of silver, with very little regard to their equality. Therefore, as far as the discovery of the weight of the Roman pound depends on their coin, it must be obtained from the gold alone.

Eisenschmid supposes, that gold coins may have lost a sensible part of their original weight, though no appearance of wear can be discovered on them, even with a glass (7). On the contrary, I have found guineas of George II, and Ann, whose wear, on the most prominent parts of the head, was visible at the first glance of the naked eye, which were above standard weight; therefore, where no appearance of wear, or other diminution, can be discovered

(6) Greaves, p. 103. (7) Eisenschmid, p. 34, 35.

on a coin, I see no reason to suppose it hath lost any sensible part of its original weight.

In the following discourse, I have collected the most authentic evidence I could find, of the weights of the Attic Drachm and the Roman Denarius; part of which I have taken from that very valuable publication of the Pembroke collection of coins. But, valuable as it is, it would have been more satisfactory to the accurate peruser, if the Noble Editor had distinguished the degree of preservation the several coins were in, and given the weights of the most perfect, nearer than to half a grain.

In the year 1759, by the favour of the learned and ingenious Dr. Gowin Knight, Principal Librarian of the British Museum, I weighed a considerable number of the most perfect Greek and Roman coins in that noble Repository.

The scales I used were good workmanship, of the common construction, made by Read; the beam 8 inches, and they turned freely with less than the 20th part of a grain. To avoid any error, I weighed each piece in both pans. My weights were most accurately sized; and, upon comparing the Troy ounce I used, with that in the archives of the Royal Society, in an exquisite balance of my late much esteemed friend, Dr. Henry Pemberton, it was found to be $\frac{3}{5}$ of a grain heavier, which I have allowed for in the following discourse.

This essay hath received very considerable additions from the inestimable treasury of ancient coins, in the possession of the learned Matthew Duane Esq; who most obligingly assisted me in taking the weights of such as were for my purpose. And it

was from the coins in this collection only, that I discovered the Egean Talent to have been the money-standard of Macedon, before Philip changed it for the Attic.

Dr. Hunter, likewise, very politely favoured me with the inspection of his curious cabinet of ancient coins, some of which I shall have occasion to mention in the following discourse; as well as some brought from Greece, by my learned friend James Stuart, Esq; who, it is hoped, will soon favour the Public with the second volume of his *Antiquities of Athens*.

§ 1. *Of the Attic Drachm.*

THE Greek coins were not only money, but weights. Thus their Drachm was both a piece of money, and a weight; their Mina was 100 Drachms as a sum, and the same number as a weight; and their Talent contained 60 Minas, or 6000 Drachms, both by weight and tale.

This way of reckoning 100 Drachms to the Mina, and 60 Minas to the Talent, was common to all Greece; and where the Drachm of one city differed from that of another, their respective Talents differed in the same proportion (8).

Of all the Greek cities and free states, both in Europe and the lesser Asia, that of Athens was the most famous for the fineness of their silver, and the

(8) Pollux, L. IX. c. 6. § 86.

justness of its weight (9): Xenophon tells us, that whithersoever a man carried Attic silver, he would sell it to advantage (1). And their money deserves our more particular attention, both because we have the most unexceptionable evidence of its standard weight; and what little we know of the money of other Greek cities, is chiefly by comparison with this.

The current coin of Athens, was the silver Drachm, which they divided into 6 Oboles, and struck silver pieces of 1, 2, 3, 4, and 5 Oboles, of half an Obol, and a quarter of an Obol (2). Their larger coins above the Drachm were, the Didrachm, the Tridrachm (3), and the Tetradrachm; which last they called Stater, or the standard.

It does not appear that they coined copper till the 26th year of the Peloponnesian war, when Callias was a second time Archon (4). It was soon after publicly cried down; and the conclusion of the proclamation was to this effect, that, silver is the lawful

(9) See Aristophanes, *Ranæ* ver. 733. Polybius, in Excerpt. Leg. § 28. Δότωσαν δὲ Αἰτωλοὶ ἀργυρίου μὴ χείρου ὧς Ἀττικῆ κ. τ. λ. and § 35. Ἀργυρίε δὲ δότω Ἀντίοχος ὧς Ἀττικοῦ Ῥωμαίοις ἀρίστου. κ. τ. λ.

(1) Xenophon *περὶ προσόδων*. c. 3. Καὶ οἱ ἀργύριον ἐξαίγχιες, καλὴν ἐμπορίαν ἐξαίγουσιν· ὅπου γὰρ αὖ πωλῶσιν αὐτὰ, πανταχοῦ πλεόν τοῦ ἀρχαίου λαμβάνουσιν.

(2) The piece of 50 gr. in P. II. T. 48. of the Pembroke collection, seems to be a Pentobolon; and the first in that plate a Hemiobolion. Mr. Stuart brought both half and quarter Oboles of silver from Athens.

(3) Pollux, L. IX. c. 6. § 60. There is a half Tridrachm of Alexander in the British Museum.

(4) See the Schol. on ver. 737 of Aristophanis *Ranæ*.

money of Athens (5). But they seem to have had copper money not long after; for Theophrastus, Demosthenes, and some of the Comic Poets, quoted by Athenæus and Pollux, mention the Chalcus, which was the name of the copper coin (6). Many pieces of Attic copper are now in being (7); and Vitruvius says, they coined copper Oboles, and quarter Oboles (8).

Authors differ in the value of the Chalcus; some say, it was the sixth part of an Obol (9), others the 8th (1); Pliny (speaking of it as a weight) the 10th (2); and Vitruvius, in the place before quoted, says, some called the quarter of an Obol Dichalcon, others Trichalcon. According to Polybius, it seems to have been the 8th part, for he makes a quarter of an Obol equal to half a Roman *As* (3); but the Denarius passing for 16 *Asses*, and the Drachm for 6 Oboles, if a quarter of an Obol was equal to half an *As*, the Denarius should be greater than the Drachm, which it never was. Polybius, therefore, gives this

(5) Aristoph. Ecclef. ver. 810 and the following.

(6) Theophrast. *περὶ ἀπόνουιας*, and *περὶ βδελυρίας*. Demosthenes c. Midiam. Athenæus, L. III. c. 32. and elsewhere. Pollux, L. IX. c. 6. § 65.

(7) Pembroke Coll. P. II. T. 48.

(8) Vitruv. L. III. c. 1.

(9) Suidas, v. Ὀβολός. v. Τάλαντον. and one of the fragments in the appendix to Stephens's Greek Thesaurus, col. 217.

(1) Pollux, L. IX. c. 6. § 65, 67. Suidas, v. Τεταρτημόριον. The fragments ascribed to Galen and to Cleopatra in Stephens's Greek Thesaurus, col. 215, 217. That ascribed to Dioscorides says, the third part. These fragments speak of it as a weight, not a coin.

(2) Pliny, Nat. Hist. L. XXI. near the end of the last chapter.

(3) Polybius, L. II. p. 103. of Casaubon's edit.

for the nearest value of half an *As* in Greek money, as it was if the Obol passed for 8 Chalci; but had it passed for 10, he would have said one 5th of an Obol, which is nearer to the true value of half an *As*; or had it passed for 6, he would have said one sixth, which is still nearer; in either case, he would not have said one fourth, as neither 10 nor 6 admits of that division. But though, when Polybius wrote, the Obol might pass for 8 Chalci, it is not impossible that at different times, or in different places, it may have passed for 6, 10, and 12.

It is a common opinion, that the Athenians coined gold, for which I can find no good authority; and from the best information I have been able to get, there does not appear to be any Attic gold coin now remaining, that was struck while they were a free and flourishing people.

The lexicographers, indeed, tell us, the *Χρυσὸς Ἀττικὸς* was equal to the Daric (4), and speak of gold mines at Laurium (5); but no ancient writer mentions such a coin, and all agree that the mines at Laurium were silver (6).

A passage in the *Frogs* of Aristophanes is, I believe, the only positive proof that can be produced from any ancient author in favour of this opinion. In ver. 732 of that comedy, he mentions a new gold coin. The scholiast on this passage tells us, that in

(4) Pollux, L. IX. c. 6. § 53. Suidas, v. *Φλαύξ*. v. *Δαρεικός*. Harpocratio, v. *Δαρεικός*.

(5) Suidas, v. *Φλαύξ*. Hesychius, v. *Λαύρεα*.

(6) Thucyd. L. II. § 55. and L. VI. § 91. Xenoph. *περὶ προσόδων*. Strabo, L. IX. p. 399, and Pausanias at the beginning of his first book.

the Archonship of Antigenes, the Athenians coined their golden images of Victory; and the author of the treatise *Περὶ ἐρμηνείας*, § 298, praises an orator for the happy choice of his expression, when he proposed this expedient; but he neither mentions the orator's name, nor the time when this happened, nor whether the Athenians followed his advice; though the scholiast's short quotation from Philochorus seems to imply that they did. But if in ver. 732. above mentioned, for χρυσίον, we read χαλκίον, it will agree better with ver. 737. where the Poet calls this money *προνήρὰ χαλκία*; and the scholiast on these words says, *perhaps the Poet means the copper money of Callias*; and this comedy was acted in his second Archonship, when that copper money was coined.

That they had no gold coin at the beginning of the Peloponnesian war, appears from the account Thucydides gives of the treasure then in the Acropolis, which consisted of silver in coin, and gold and silver bullion (7); but he would certainly have mentioned gold in coin, had there been any.

Therefore the ἀρχαῖον νόμισμα of Aristophanes could not be gold, nor the base καμνὸν χρυσίον of equal value with the Daric; whence I conclude, καμνὸν χαλκίον to be the true reading; and that it was the copper money above mentioned, which was afterward cried down.

Athenæus tells us that gold was extremely scarce in Greece, even in the time of Philip of Macedon; but that, after the Phocéans had plundered the

(7) Thucyd. L. II. § 13.

Pythian temple, it shone forth among the Greeks (8). Philip conquered these Phoceans, and put an end to the holy war, as it was called.

About the time this war broke out, he took the city Crenides, on the borders of Thrace, which he enlarged, and called Philippi, after his own name; and he so improved the gold mines in its district, which before were of small account, that they produced above a thousand talents yearly, and enabled him to coin gold, which he called Philippics (9).

What Athenæus says of the scarcity of gold, may be true, if confined to Macedon, and the poorer states of Greece; but must not be extended to Corinth or Athens; for though Thucydides does not specify the quantity of gold that was in the Athenian treasury at the beginning of the Peloponnesian war, it was, probably, not inconsiderable; for the gold about the statue of Minerva weighed 40 talents, which valued (according to Herodotus) at 13 times its weight in silver, will be found to amount to above 120,000 pounds sterling.

There is a gold coin in the British Museum, of elegant workmanship, with the head of Minerva on one side, and the owl and oil bottle on the other, the inscription AΘE, and under the oil bottle the letters MH. It weighs $109\frac{1}{2}$ Troy grains; but being a little worn, it probably, when new, came up to the just weight of the Roman Imperial Aureus. Whence we may conclude, that, when this piece was struck, the Athenians had reduced their money to the

(8) Athenæus, L. VI. p. 231. See Diodorus, L. XVI. p. 527. Stephens's edit. (9) Diodorus, L. XVI. p. 514.

Roman standard, and that their Drachm was then equal to the Denarius. But I cannot find there is any Attic gold now extant, that was coined before Greece became subject to the Romans.

The Persian Daric seems to have been the gold coin best known at Athens in ancient times. This they called Stater (1), probably because it was the standard to which their Drachm was originally adjusted, which the Lexicographers tell us was half its weight (2).

Though Greaves says, the Daric is still found in Persia, it is certainly very scarce, and perhaps of doubtful antiquity.

For want, therefore, of the Daric, we must have recourse to the gold of Philip, who took either that coin or the Attic Drachm for his standard; as will appear, when I come to compare his money, and that of his son Alexander, with the Attic silver. This he probably did, with a view to his intended invasion of Asia; for the ancient standard of Macedon was very different from that of Athens, as I shall shew hereafter.

Philip and his son Alexander coined gold of 4, 2, 1, and half an Attic Drachm. Mr. Duane hath a coin of Berenice, the wife of the second Antiochus, weighing a quarter of a Drachm. In the Pembroke collection is a gold medal of Lyfimachus, of 8 Drachms; and Mr. Duane hath another of the like weight. But the Daric or χρυσῆς was didrachmal,

(1) Herodotus, L. VII. § 28. and Thucyd. L. VIII. § 28. call it *Στατήρ δραχμῆος*.

(2) Pollux, L. IV. c. 24. Hesychius, v. *Χρυσοῦς*.

and there are more of that species now remaining, than of any other.

In the British Museum are three gold coins of Philip, which have all the sharpness of new money fresh from the mint. The heaviest of them weighs above $132\frac{3}{5}$ Troy grains. A fourth, in the same collection, hath a hole punched through it; but in other respects, seems as perfect as the rest, and is the heaviest but one, of the four. There is likewise, a double Philippic of Alexander, perfect and unworn, which weighs $265\frac{3}{10}$ grains.

There are two more of Philip, in this collection, each weighing 132 grains, one of Alexander, of $132\frac{1}{5}$, and another of $131\frac{3}{5}$; but these are all a little worn, therefore I shall make no use of them.

Mr. Stuart brought home a Philippic, which, though not so fair in appearance as the best in the British Museum, weighed $133\frac{7}{10}$ grains.

Out of seven of the most perfect gold coins of Philip and Alexander, in Mr. Duane's collection, four weighed 133 grains each. He hath a most beautiful coin of Alexander of Epirus, brother to Olympias, the mother of Alexander the Great, weighing $132\frac{1}{3}$ grains; the workmanship is exquisitely fine, and as perfect as when it was first struck.

Greaves tells us, he bought at Alexandria a Philippic of Alexander, which he thought the fairest in the world, weighing exactly $133\frac{1}{2}$ English grains. But, to bring it up to the standard of his Tetradrachm of 268 grains, he supposes it might want half a grain, either by time, or the mint (3). His mentioning

(3) Greaves, p. 72.

the mint shews, he could not discern any appearance of wear upon it, therefore I suppose it was perfect.

He found two of the same weight in the possession of Sir Simonds D'Ewes.

He bought another at Constantinople, which weighed 133 grains; with which comparing one of Sir John Marsham, he found the latter a grain deficient.

He quotes Snellius for two gold coins, one of Philip, the other of Alexander, each weighing 179 Dutch grains, which, he says, answer to $134\frac{1}{2}$ English (4). But in this he is mistaken, for they answer to no more than $132\frac{1}{2}\frac{7}{8}$ (5). Snellius, to favour an ill founded hypothesis of his own, supposes they had lost somewhat of their first weight (6), but does not say they had any such appearance; and as they outweigh the heaviest in the British Museum, it is probable they were perfect.

In the Pembroke collection are two gold coins, one of Philip, weighing 134 grains, the other of

(4) P. 71.

(5) Eitenschmid. p. 16. says, Budelius, who was master of the mint at Cologne, found the money-ounce used in Flanders and the United Provinces, to weigh $579\frac{1}{2}$ Paris grains (equal to $475\frac{1}{2}$ Troy) and that Gassendus found it but 577. See also the Memoires of the Royal Academy of Science, for the year 1767. pp. 364, 370. I weighed the Dutch half marc of 4 ounces, from Amsterdam, in an excellent balance, and found it to weigh 3 ounces, 19 p. weight, and 4 grains Troy; which divided by 4, gives 19 p. weight, 19 grains, or 475 Troy grains, for the weight of the Dutch ounce. This ounce contains 640 Dutch grains; and

As 640 to 179, so are 475 to $132\frac{1}{2}\frac{7}{8}$, the weight of Snellius's coins.

(6) See Snellius *de re nummaria*, Vol. IX. of the *Thesaurus Antiquitatum Græcarum*, col. 1583.

Alexander,

Alexander, weighing 266, which, by their weights, should be perfect

The difference between the heaviest and the lightest of these pieces supposed to be perfect, does not amount to two grains in the Philippic; and a mean, taken from such a number of coins, so equally sized, must be very near their original standard weight.

In the following table, I have not inserted any piece, that I had reason to believe was sensibly deficient of its original weight. Therefore I have omitted Sir John Martham's coin of 132 grains, which being deficient of the least weight I have found in any perfect piece, it is most probable it was a little worn. I have likewise omitted three coins in the Pembroke collection, of 132 grains each, for the same reason.

The pieces under the letter M, are from the British Museum; those under D, from Mr. Duane's collection; that marked S, Mr. Stuart's; G, is the mark for those mentioned by Mr. Greaves; Sn. for the two of Snellius; and P, for two from the Pembroke collection. The parts of a grain are given in decimals, for the convenience of adding them.

Troy grains.	
Philip . . M.	132,62
	132,23
	132,03
with a hole	132,46
Alexander . .	265,3
Philip . . . D.	133
	133
	133
Alexander . . .	133
	132,5
	132,5
	265,5
Philip . . . S.	133,7
Alexander . G.	133,5
	133,5
	133,5
	133
Philip . . . Sn.	132,85
Alexander . . .	132,85
Philip . . . P.	134
Alexander . . .	266
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	24)3190,09
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Mean Philippic	132,92

As none of these pieces can have increased their original weight, but, on the contrary, some may have lost a small part of it, we may fairly conclude, that the standard weight of the Philippic was not less than 133 Troy grains; but probably somewhat greater.

In

In the Pembroke collection is a gold coin, or rather medal, of Lyfimachus, weighing 540 grains. Mr. Duane hath another of them, which wants but $2\frac{2}{3}$ grains of the same weight. This piece should weigh 8 Drachms, and is of great importance on that account, as large weights and measures are more to be depended on, in inquiries of this kind, than smaller. According to this coin the Philippic should weigh 135 grains, and the double Philippic 270: but none have yet been found to come up to these weights. Some few silver Tetradrachms exceed 270 grains, but they are very uncommon, and far the greatest number of such as seem most perfect, full short of 266. Neither is the ancient silver so correctly sized, as to stand in competition with the gold of Philip and Alexander. Therefore, either the mint-weights of Lyfimachus were heavier than the Philippic standard, or his money was less carefully sized: or, lastly, this piece, being intended rather for a medal than a coin, was purposely over sized.

The silver coins of Philip and Alexander confirm what the lexicographers tell us, that the golden Stater of Philip, weighed two Drachms.

In the British Museum is a Drachm of Philip, weighing $67\frac{3}{8}$ grains, and another of Alexander of $66\frac{1}{3}$, both perfect. In the Pembroke collection is one of Alexander, which weighs 67 grains. These give a didrachm of $134\frac{3}{4}$, $133\frac{1}{3}$, and 134 grains.

267½	Seven perfect tetradrachms of Alex-
266	ander, out of a much greater number,
265½	in Mr. Duane's collection, give a mean
264½	Didrachm of a little more than 132½
264½	grains, as in the margin; which
264	answers near enough to the gold
263⅞	coins, to prove, that the Drachm was
	the common standard, both for the
14) 1855½	gold and silver money.

Mean 132½ +

I shall now shew, that this was the Attic Drachm.

The silver Stater, or Tetradrachm, is the most common Attic coin now remaining, and some of them are in very perfect preservation. They all have the head of Minerva on one side, and an owl on the other, with the inscription AΘE. Eifenschmid observes, that they appear, by the workmanship, and other circumstances, to be of different ages (7).

The most ancient are very rude work (8), of a small diameter and thick. He had one of them in the most perfect preservation, weighing 273¼ Troy grains; and there is one like it in the British Museum of 272⅞ grains.

The second sort is somewhat better work, though rude, and the owl stands in a square; but in other respects is like the former. The eighth and ninth coins P. II. T. 48. of the Pembroke collection,

(7) Eifenschmid. p. 44.

(8) See Eifenschmid's figure, and c. 7. of P. II. T. 48. of the Pembroke collection.

seem to be of this sort. The eighth weighs 266 grains; and by having the weight put to it, and not to either of the other two in the same plate, I suppose it is well preserved, and perhaps perfect. These and the above mentioned have an olive branch coming from the edge to the owl; and both, by the rudeness of the work, should be older than the time of Pericles, under whose administration sculpture flourished at Athens.

The work of a third sort is more elegant, though not highly finished. Its diameter is equal to that of an English half crown. The face of Minerva is beautiful; the owl stands on an oil bottle, and is encompassed by two olive branches, and, besides the inscription AΘE, hath some monograms and symbols near the owl.

A fourth sort, of the same size, is generally higher finished; and besides the inscription AΘE, hath instead of the monograms, a name or names about the owl, perhaps of the mint-masters, or, as Mr. Stuart conjectures, of the owners of the mine that produced the silver. These likewise have commonly some symbol near the owl. Some of them have a letter on the belly of the oil bottle, and two letters under it, as it were in an exergue. They seem to be of a later date than the last mentioned; for none that I have seen have the E for H, or the O for Ω in the names, though they retain the E in AOE; but the long vowels did not come into use at Athens till after the Peloponnesian war, as appears by inscriptions now remain-

ing (9), therefore, these must have been struck after that time; and if any now remain, that were struck during that war, they must be those with monograms.

The Attic money is not so equally sized as the Philippic silver. Mr. Duane hath a Tetradrachm with the letter K on the oil bottle, and ΔΙ under it, inscribed ΜΕΝΤΩΡ ΜΟΞΙΩΝ, which weighs $271\frac{3}{4}$ grains, and another with the same letters on and under the oil bottle, inscribed ΚΛΕΟΦΑΝΗΣ ΕΠΙΘΕΤΗΣ, in as perfect preservation, which weighs but 265 grains.

An Attic Tetradrachm in the British Museum, which appears to be but little worn, and not otherwise diminished, weighs but $247\frac{1}{2}$ grains. We can hardly suppose, that this was struck to the same standard as Eifenschmid's ancient Tetradrachm of above 273 grains. That in the Pembroke collection, of 207 grains, hath probably been filed on the edge.

There are, however, a considerable number of Attic Tetradrachms, that answer in weight to those of Philip and Alexander, as nearly as can be expected, from coins so unequally sized. Mr. Stuart brought a very ancient one from Greece, weighing $265\frac{1}{2}$ grains; Mr. Duane hath one of the like age, which weighs $265\frac{1}{4}$; they are both well preserved, and can have lost very little of their original weight: one, with a monogram and symbol, of $266\frac{1}{4}$ grains; another, inscribed +ΑΝΙ of the same weight, two of 265 grains, and one of $265\frac{1}{4}$. These answer so nearly

(9) See Montfaucon's *Palæographia Græca*, p. 135. and the *Marmor Atheniense*, lately published by Mr. Chambers. The Scholiast on ver. 688 of Euripides's *Phœnissæ* dates the introduction of the long vowels into Athens, in the Archonship of Euclides.

to the weights of Alexander's Tetradrachms, that we cannot doubt of the equality of his standard to that of Athens. And the gold Philipics of him and his father are so correctly sized, and so perfect, that the mean Didrachm derived from them, of 133 Troy grains, must be very near its just weight; and its half, 66½, that of the Attic Drachm.

§ II. *Of the Egeian and Euboic Talents.*

THE Attic was not the only money-talent used in Greece. Historians and others mention the Egeian and the Euboic Talents. The former weighed 10000 Attic Drachms, but, like other Talents, contained only 6000 of its own; which being so much heavier than the Attic, the Athenians called it *παχέαν δραχμήν*, or the thick drachm (1). This Talent was used at Corinth, as appears by a passage in A. Gellius, where the Corinthian Talent is valued at 10000 Attic drachms (2): and as Corinth was a place of great trade, it was probably used in most of the cities of the Peloponnesus.

If the Attic Drachm weighed 66½ Troy grains, the Egeian should weigh 110½; which, to avoid fractions, and because our Attic Drachm is rather under-sized than otherwise, I shall call 111.

There are Macedonian coins, struck before Philip coined gold, that answer to this standard. One of Philip, in the Pembroke collection, weighs 224 grains.

(1) See Pollux, L. IX. c. 6. § 86 and 76.

(2) A. Gellius, L. I. c. 8.

Mr. Duane hath a silver coin, of either the first or second Alexander, which weighs $447\frac{1}{2}$ grains; three of Philip, of 221 each; another of Philip, of $223\frac{1}{4}$; and a fifth, $223\frac{1}{4}$. The mean Drachm from these six coins is $111\frac{1}{4}$ grains, which comes as near to the Egeian drachm, as can be expected from so small a number of silver coins. Therefore, the Egeian Talent must have been the standard of the Macedonian money, till Philip changed it.

It appears likewise to have been the standard of the Ptolemaic money in Egypt. Mr. Duane hath a gold coin of the Ptolemies, like c. 1. T. III. of the Pembroke collection, weighing nearly $27\frac{1}{2}$ grains; Mr. Stuart another, weighing $27\frac{3}{8}$: supposing each was a quarter of the Drachm, the former will give it almost 110 grains, the latter $108\frac{1}{2}$; but they are both a little worn. Mr. Duane hath a gold coin of Arsinoë, like c. 3. T. III. of the Pembroke collection, which weighs 430 grains; and Dr. Hunter hath another of the same weight, which give a Drachm of $107\frac{1}{2}$ grains. Dr. Hunter hath likewise a perfect silver coin of one of the Ptolemies, weighing 221 grains, another of 220, and a third of $109\frac{1}{4}$; but the two last are a little worn. The Ptolemaic gold coins in the Pembroke collection give the Drachm from 107 to 108 grains. As the piece of 221 grains wants but half a grain in the Drachm of the Egeian standard, and that of 107 but four grains, we may fairly conclude that Talent to have been the money standard of the Ptolemies. And not only so, but that it was originally Egyptian. For what should induce Ptolemy, to relinquish the standard established by Alexander, and used all over Asia and the

the greater part of Greece, but that he found the Egean Talent established in Egypt, when he possessed himself of that opulent kingdom.

Yet so imperfect are the accounts now remaining, of the ancient weights, that no writer hath mentioned this Talent, or one like it, as used in Egypt. On the contrary, Pliny tells us, on the authority of Varro, that the Egyptian Talent weighed 80 Roman pounds (3). But this is undoubtedly a false reading, and for *Ægyptium* we should read *Euboicum*; for Pliny is speaking of the riches of Asia, where the Euboic Talent was used for weighing gold; and we know the weight of that Talent was settled at 80 Roman Pounds, by the treaty between the Romans and Antiochus.

The fragment of weights and measures ascribed to Galen, makes the Egyptian Mina to weigh 16 Ounces (4); and consequently, the Talent 80 Roman Pounds. But this Talent could not be the standard of the Ptolemaic coins.

There is a passage in Pollux which makes the Egyptian Talent contain 1500 Attic Drachms (5). But this is an injudicious interpolation in the last edition of that author.

The fragment ascribed to Cleopatra, and one that follows it, mention a Ptolemaic Mina of 18 Ounces, whose Drachm should weigh $75\frac{3}{5}$ Troy grains; and Cleopatra says, there was an Egyptian Drachm, which weighed but the sixth part of the Attic.

(3) Nat. Hist. L. XXXIII. c. 3.

(4) Stephani Thef. Græc. t. IV. col. 25.

(5) L. IX. c. 6. § 86.

Galen (6) and the fragment ascribed to Dioscorides say, the Mina of Alexandria weighed 20 Ounces, or 120 Drachms. By Drachms, Galen certainly meant Denarii of 8 in the Ounce; for he tells us, that, in his time, a Drachm was always understood to mean what the Romans call a Denarius (7). The Drachm of this Mina should weigh 84 grains.

Lastly, Festus says, the Alexandrian Talent contained 12000 Denarii (8). If by Denarii he meant Attic Drachms, this Talent should be just double the Attic.

None of these talents could be the standard of the Ptolemaic money. Though, if Galen's Alexandrian Mina weighed 160 ancient Attic Drachms, its Drachm would weigh $106\frac{2}{3}$ Troy grains, which comes near to the Ptolemaic standard. But the coins require a greater weight, and the Egean Mina should weigh $166\frac{2}{3}$ Attic drachms.

The Euboic Talent certainly came from Asia; for, Herodotus tells us, the Kings of Persia weighed their gold by that Talent (9). In the same place he informs us, that the Babylonian Talent weighed 70 Euboic Minas. Pollux says, it weighed 70 Attic Minas (1). Therefore the Euboic Talent should be equal to the Attic. But Ælian tells us, it weighed

(6) See the word *Μνᾶ* in the index to Stephens's Greek Thesaurus.

(7) Πρόδηλον ὅτι δραχμῶν λέγομεν νῦν ἐν τοῖς τοιούτοις ἁπασιν, ὅπερ Ῥωμαῖοι δλωάριον ὀνομάζουσιν. Galen, L. VIII. De compos. medicam. as quoted by Gronovius, L. II. c. 6. De Pecun. Vet.

(8) Festus, De Verborum Signif. v. TALENTUM.

(9) Herod. L. III. § 89. (1) Pollux, L. IX. c. 6. § 86.

72 Attic Minas (2); and if so, the Euboïc Talent should be heavier than the Attic, in the proportion of 72 to 70.

An article in the treaty between the Romans and Etolians, recorded by Polybius (3), whereby the latter were to pay a certain number of Euboïc Talents, in silver of Attic fineness, seems to favour this inequality of the two Talents: for, had they been equal, there would have been no occasion to specify the quality of the silver by the standard of one country, and its weight by that of another.

But, if the Euboïc Talent was the standard used in the commerce between Greece and Asia (as it seems to have been) both countries were concerned to keep it up to its just weight; which was a sufficient reason for the preference given to it by the Romans, on account of its authenticity, whether the Attic Talent was equal to it or not.

And there is a circumstance very strongly in favour of their equality, which is, that if Philip changed the money-standard of his own country, with a view to the invasion of Asia, (as is highly probable), he certainly adopted the standard of the Daric, which was the Euboïc Talent, by which the Kings of Persia weighed their gold. But his money answers to the Attic Talent, as I have shewn above.

Pollux nowhere mentions the Euboïc Talent; and if he took his estimate of the Babylonian Talent from Herodotus, he certainly thought the Euboïc Talent was equal to the Attic.

(2) Var. Hist. L. I. c. 22.

(3) Polyb. Excerpt. Legat. § 28.

But the numbers in the account Herodotus hath given of the revenue of Darius, as they now stand, disagree with each other, and must be faulty in more places than one; and as probably in his value of the Babylonian Talent as elsewhere.

He tells us, the King of Persia weighed his silver by the Babylonian Talent; therefore, that must have been reckoned the silver Talent of the empire, and was probably the standard of their silver coin.

Xenophon, in his account of the expedition of Cyrus, says, the Asiatic Siglus was worth $7\frac{1}{2}$ Attic Obolus (4). This coin seems to have been the Drachm of the Babylonian Talent; and if that Talent weighed 72 Attic Minas, the Siglus was really worth but $7\frac{1}{2}$ obolus; but the place Xenophon here speaks of, was near Babylon, where the Attic money was unknown and consequently undervalued in common currency, This however shews, that, if the Babylonian Talent was the standard for the silver coinage in Persia, its weight probably exceeded 70 Attic Minas.

The same author tells us, that Cyrus paid Silanus the Ambraciot 3000 Darics for ten Talents. Therefore, the Talent of silver was worth 300 Darics. And if 3000 Darics were coined out of the Euboic Talent of gold, 300 weighed six Euboic Minas: and supposing the Babylonian Talent to weigh 72 such Minas, the price of gold, at that time, was twelve times its weight in silver, as Plato, who was Xenophon's contemporary, tells us it was (5).

By the former of these passages, it appears probable that the Babylonian Talent weighed above 70

(4) Xenoph. Exped. L. I. (5) Plato, in his Hipparchus.

Attic Minas; by the latter, that it weighed above 70 Euboic Minas; and if Pollux took his value of the Babylonian Talent from Herodotus, as the text now stands, and Ælian his value of the same, from a more correct copy of that author, or from some better authority, the Euboic Talent must have been equal to the Attic.

§ III. *Of the Roman Money.*

PLINY hath given the following historical account of the Roman coinage: “ Silver was first
 “ coined at Rome in the 485th year of the City,
 “ when Q. Ogulnius and C. Fabius were Consuls,
 “ five years before the first Punic war. And the
 “ denarius was made to pass for ten pounds of cop-
 “ per; the quinarius, for five; and the sesterce, for
 “ two and a half. But the weight of the *As* was
 “ reduced in the first Punic war, when the republic,
 “ being unable to defray its expences, resolved to
 “ coin six *Asses* out of the pound; whereby they
 “ gained five parts, and paid their debts. The
 “ stamp of the *As* was a double-faced Janus on one
 “ side, and the prow of a ship on the other: on the
 “ triens and quadrans a boat. After this, when they
 “ were pressed by Hannibal, Quintus Fabius Maxi-
 “ mus being dictator [*about the year 537*], the *As*
 “ was reduced to one ounce, and the silver denarius
 “ made to pass for 16 *Asses*; the quinarius, for eight;
 “ and the sesterce, for four. And the republic gained
 “ one half [*upon the copper money*]. But in the pay
 Vol. LXI. R r r “ of

“ of the army, the soldier always received a *silver*
 “ denarius for ten *Aſſes*. The ſtamp of the ſilver
 “ money was a chariot and a pair, or a chariot and
 “ four horſes; whence they were called *Bigati* and
 “ *Quadrigati*. The *As* was ſoon after reduced to half
 “ an ounce, by the Papirian Law.—What is now
 “ called the Victoriat, was coined by the Clodian Law;
 “ before which, it was imported from Illyricum as
 “ merchandize: its ſtamp is a Victory, whence it
 “ takes its name. The gold money was coined fixty
 “ two years after the ſilver, and the ſcruple paſſed
 “ for twenty ſeſterces, which, as the ſeſterce was
 “ reckoned at that time [$2\frac{1}{2}$ *Aſſes*], made the pound of
 “ gold worth nine hundred *ſilver* denarii (1) [*of 16*
 “ *Aſſes each*]. It was afterward thought proper to coin
 “ forty pieces out of the pound of gold. And our
 “ Princes have, by degrees, diminiſhed their weight
 “ to 45 in the pound (2).”

Thus far Pliny, whoſe date of the firſt coinage of ſilver is confirmed by Livy (3).

The Denarii now remaining are of various kinds. The moſt ancient are the *Bigati* and *Quadrigati*, having on one ſide the head of a woman in a helmet, with

(1) The common reading is ſeſtertios DCCCC, which I ſhall conſider hereafter.

(2) Plin. Nat. Hiſt. L. XXXIII. c. 3. In moſt editions of Pliny before Hardouin, the numbers 40 and 45, are thus written X. XL. M. and X. XLV. M. whence Agricola and Snellius have ſuppoſed the M. after the former number, to be a miſtake of the tranſcriber for II. and that after the latter for III. But Hardouin in his note on this paſſage hath ſhewn the M. in both places, to be ſuperfluous. In the laſt clauſe, I read *minutiſſimè vero*, not *minutiſſimè Nero*.

(3) See the epitome of L. XV.

the

the inscription ROMA, and the mark of the Denarius X or X , and some few XVI, and a Biga or Quadriga on the other. The next to these in antiquity have the head of Roma, or some other Deity, on one side, and on the reverse, the name of the mintmaster, or mintmasters, with historical or emblematical figures. Many of these have the X or X , which continued to be the mark of the Denarius long after it passed for 16 *Asses*; whence some have concluded that it was reduced again to ten *Asses*, contrary to the express testimony of Vitruvius (4); and Tacitus tells us that the mutinous legions in Pannonia demanded, to have their pay raised from ten *Asses*, to a Denarius. A third sort hath the head of a Consul or a General on one side, with an historical or emblematical reverse. Few, if any, of these have the mark X or X upon them. These three sorts are called Consular Denarii, as having been struck during the republican government by Consuls. The Imperial Denarii have commonly the head of the reigning Emperor, with his name and titles on one side, and some emblematical figures on the reverse, with a suitable inscription.

The Romans coined their first gold money by the Scruple, as appears from Pliny's account, which is confirmed by the coins; for he tells us the Scruple passed for twenty Sesterces, and the reare gold coins now remaining with the numerals XX, and XXXX, which answer to the weight of one, and two ancient Roman Scruples. These have the head of Mars on one side, with the numeral letters denoting their value,

(4) Vitruvius, L. III. c. 1. So likewise Volusius Mærianus. Taciti Annal. L. 1. § 17. & 26.

and, on the reverse, an Eagle standing on a Thunderbolt. The latter coins of this scrupular standard are like the Denarii of the age in which they were struck; as was the gold of the different standards that succeeded it.

The Romans did not use the Denarius for a weight, as the Greeks did their Drachm; till the Greek physicians coming to Rome, and finding the two coins nearly equal, prescribed by it, as they had been accustomed to do by the Drachm in their own country. Neither did the Roman Pound depend on the weight of the Denarius, as the Greek Mina did on that of the Drachm; but the weight of the Denarius depended on the Pound.

The antient Roman Pound was divided into 12 Ounces, and the Ounce into 24 scruples (5). And we learn from Celsus and Pliny, that 84 Denarii were coined out of the Pound of silver (6); therefore, if we knew the true weight of the Roman Pound, we should thence know that of the Denarius.

There are many antient Roman weights now remaining, from under an Ounce to 100 Pounds (7); some of them with inscriptions have the appearance of standards.

Lucas Pætus, from an antient weight of 10 Pounds, another of 4 pounds, and a third of 1 pound, inscribed EX. AVC.D.CAS. in letters of silver, besides three smaller of 3, 6, and 9 ounces, all six perfect and

(5) Varro de Re Rustica, L. I. c. 10. Columella, L. V. c. 1. and Volusius Mæcianus.

(6) Celsus de Medicina, L. V. c. 17. Pliny, Nat. Hist. L. XXXIII. c. 9.

(7) See Thef. Antiq. Roman. Vol. XI. col. 1661.

agreeing together, determined the antient Pound to contain 11 ounces, 10 scruples, modern Roman weight (8). But where he gives the weight of Vespasian's Congius (9), he makes ten antient Roman Pounds to weigh 9 pounds 6 ounces 10 scr. 10 gr. modern weight. The modern Roman ounce contains, like the antient, 24 scruples, the scruple 24 grains. Therefore, according to this determination, the antient Roman Pound should weigh 11 ounces, 10 scr. $15\frac{2}{3}$ gr. modern weight, which is equal to $5012\frac{1}{3}$ Troy grains, if the exact weight of the modern Roman ounce be 438 Troy grains, as Greaves reckons it. But Pætus used a steelyard, which is a very fallacious instrument.

Gruter hath exhibited a considerable number of ancient Roman weights (1). Such of marble, from 1 to 10 pounds, as were intire, have neither mark nor inscription. His two heaviest weigh 9 pounds 8 ounces each, modern Roman weight, which give an antient Pound of 5081 Troy grains. Such of the rest as are supposed to be intire, make it under 5000. His lesser weights vary considerably. The Triens of Rusticus gives a pound of 5092 Troy grains; his Sextans one of 5246. Among the brass weights are two inscribed AD. AVGVST. TEMP. C. P. One of five Pounds, weighing 5 pounds $2\frac{1}{2}$ ounces, makes the ancient Pound equal to 5475 Troy grains; the other is a Triens, and weighs 3 ounces, 19 scr. 4 gr. which gives 4992 Troy grains for the Roman Pound.

(8) Thef. Antiq. Roman. Vol. XI. col. 1619.

(9) Ibid. col. 1635.

(1) Gruter's Inscriptions, p. ccxxi.

Fabretti blames Pætus for making the ancient Roman Pound lighter than the modern (2), and produces ten ancient weights, to prove the contrary. Three of them are of brass, and by their inscriptions have the appearance of public standards. One, with the mark X, weighs 10 pounds 5 oz. 14 scr. modern Roman weight, which, reduced to Troy grains, give $5500\frac{1}{2}$ for the antient Pound. Another, marked V, weighs 5 pounds, $2\frac{1}{2}$ oz. and gives 5475 Troy grains for the antient Pound. A third marked II, weighs 2 pounds, 1 oz. 9 scr. which makes the ancient Pound amount to 5557 Troy grains. His white marble weight hath no other inscription but the mark I, for one pound, and weighs 13 ounces, $1\frac{1}{2}$ scr. equal to 5721 Troy grains. The rest of his weights are from five ounces to three scruples, and give an ancient Roman Pound from almost 5500 Troy grains to above 5780.

At the end of Eifenschmid's preface, we find two *Asses librales*, one equal to $5407\frac{1}{2}$ Troy grains, the other to $5315\frac{5}{8}$; and a *Quadruffis* of 21351 Troy grains, which gives a pound of $5337\frac{3}{4}$.

According to Fabretti's weights, the ancient Roman Pound could not weigh less than 5475 Troy grains, which is much greater than can be derived from any other evidences, as I shall shew hereafter. But, as many of the abovementioned weights have the appearance of public standards, I have thought proper, to take more particular notice of them, than writers on this subject have commonly done.

Both Villalpandus and Greaves relied on the Congius of Vespasian for the standard weight of the

(2) Fabretti Inscript. p. 523.

Roman Pound, not doubting its authenticity, though the note in Gruter says, some have suspected it (3). What foundation they had for such suspicion, does not appear; but it is very difficult, to counterfeit the genuine cracks and corrosions of antiquity, in a vessel of this kind; and Greaves tells us, that while he was in Italy, there was found, among the ruins at Rome, a Semicongius in brass, of the same figure with this of Vespasian, the sides much corroded with rust. This he also measured, and found it to be half of Vespasian's Congius (4). But weights are easily counterfeited; and when the remains of antiquity were so eagerly sought after, that artists found it worth their while to counterfeit the ancient coins, others might counterfeit the weights.

The Roman Congius contained ten Pounds weight of wine (5). Vespasian's standard is of brass; Pætus, Villalpandus, and Greaves, have given drawings of it; and Gruter tells us, the inscription was in letters of silver.

Pætus filled this vessel to the narrow part of the neck with rain water, and weighed it with a steelyard. But this instrument is liable to great errors; therefore his weight, which wants $5\frac{1}{2}$ modern Roman ounces of what Villalpandus found it, is of small authority.

Villalpandus filled it to the same height with spring water, and found it to contain just ten modern Roman pounds, which are equal to 52560 Troy grains.

Auzout, filling it likewise to the same height with spring water, weighed its contents twice; and the near

(3) Gruter's Inscriptions, p. ccxxiii.

(4) Greaves, p. 92. in a note.

(5) Festus de verb. signif. v. PUBLICA PONDERA.

agreement of its capacity deduced from his weights, with Greaves's measure, by Millet (6), is a proof of their being very near the truth.

Auzout's greater weight was 63024 Paris grains, equal to $51699\frac{3}{8}$ Troy; his lesser, 62760 Paris grains, equal to $51482\frac{4}{5}$ Troy (7). It is not said, at what time of the year either of these weights was taken; but the heat in summer, and the cold in winter, might have made a much greater difference between them.

The mean between both is $51591\frac{1}{10}$ Troy grains, which, divided by 10, give $5159\frac{1}{10}$ such grains for the weight of the ancient Roman Pound.

Fabretti insists, that this vessel ought to have been filled up to the brim (8); but the part above the neck seems to have been designed, either to prevent the liquor from spilling when poured out, or for a security against the diminution of the standard, which such a finishing rendered impracticable.

Several objections have been made to this Pound derived from the Congius, of which the following are the most material.

First, whereas the side of the Quadrantal containing 8 Congii, should be equal to the Roman Foot; the side of a cube, containing 8 times this vessel, exceeds the most authentic measures of that foot now remaining. But, as this relation of the two standards to each other was of an ancient date, when all work-

(6) See Philosoph. Transf. Vol LI. p. 790.

(7) Divers ouvrages de Mathematique & de Physique par Mess. de l'Academie Royale, Paris, 1693, in folio. p. 366.
371.

(8) Fabretti Inscript. p. 527.

manship was probably very rude and inaccurate at Rome, we cannot wonder at such a disagreement; especially as both the shape of this vessel and the inscription shew it was not adjusted by the foot measure, but by weight.

Secondly, the same bulk of any liquor being found to weigh more in winter than in summer, we cannot determine the precise weight of the Roman Pound from the contents of this vessel, unless we knew the season of the year in which it was originally adjusted.

Thirdly, Villalpandus seems to have made his experiment carefully (9); but his weight exceeds Auzout's lesser weight by above 1000 Troy grains; though both used spring water. Now if two curious persons, who endeavoured to discover the exact weight of the antient Roman Pound, could differ so much in weighing the contents of the same vessel, can it seem improbable, that the Roman officer, to whose department the adjusting this standard might happen to belong, should differ as much from its just weight? But if he happened to be a person of accuracy, he would take care, that the standard of a measure of capacity should not fall short of its ancient dimensions, which is extremely unpopular; and, though he might endeavour to be exact, he would rather chuse to err in excess than defect. Therefore, this vessel is more likely to give too great a Roman Pound, than too small a one.

Fourthly, this vessel was by law to contain ten Pounds weight of wine; which being lighter than water, the weights above-mentioned must be too

(9) See Greaves, p. 92.

great. But probably the Romans of that unphilosophical age when this standard was first established were ignorant of this difference; and it might not be generally known, or not attended to, even in Vespasian's time; for Remnius Fannius, who lived long after, treating of the weights of various liquids, supposes the weight of wine to be equal to that of water,

Nam libræ, ut memorant, bessim sextarius addet,
Seu puros pendas latices, seu dona Lyæi.

And though he afterward tells us that some wines and some waters are heavier than others, he does not say that water is in general heavier than wine. And even at this day, when the specific gravities of different liquors are so generally known, our books of Pharmacy call a wine pint of any liquor a pound. Therefore it is not improbable that this standard was adjusted by spring water in the reign of Vespasian.

But if it was really adjusted by wine, the difference may be considerable; for, according to Eifenschmid's table of the specific gravities of various liquids (1), that of pump-water is to Burgundy wine in the proportion of 371 to 355; and Auzout's mean weight of 5159 Troy grains diminished in this proportion, gives but 4936½ such grains for the antient Roman Pound.

All the above circumstances considered, it seems more probable that this standard should give too great a Roman Pound, than too small a one. But as no-

(1) Eifenschmid, p. 174, 175.

thing certain can be determined from it, we must have recourse to the coins, especially the gold, which though not so correctly sized as the Greek Philippics, are much more so than the silver Denarii.

Pliny tells us, that when the Romans first coined gold, they made the Scruple pass for 20 Sesterces.

In the tables VI, VII. and X. of the Pembroke collection, we find nine pieces, weighing 17 grains, $26\frac{1}{2}$, $33\frac{1}{2}$, $51\frac{1}{2}$, 53, 105, 107 twice, $107\frac{1}{2}$.

That this was the scrupular coin mentioned by Pliny appears from the numeral letters XX for 20 Sesterces, on the smallest, and XXX on that of $33\frac{1}{2}$ grains, which should be its double; and all the rest are multiples of somewhat between 17 and 18 grains, except the second, which is a Scruple and half. What the mark \downarrow X on that of $51\frac{1}{2}$ grains denotes, I cannot tell. Savot, and Hardouin (2) call this figure \downarrow a V, and say VX stood for 15; but though the Greeks often placed their numerals from right to left, I cannot find that the Romans ever did.

These nine pieces should contain $34\frac{1}{2}$ Roman scruples: Their weight amounts to 608 Troy grains, which, divided by $34\frac{1}{2}$, give $17\frac{4}{5}$ for the Scruple; whence the Roman Pound should weigh $5073\frac{1}{5}$.

(2) Savot, P. III. c. 7. Hardouin's note on Pliny. This piece is 3 Roman scruples, which valued at 60 Sesterces of $2\frac{1}{2}$ *Affes* to the Sesterce, was worth 150 *Affes*, or 9 silver Denarii and 6 *Affes*, wanting but 2 *Affes* of $9\frac{1}{2}$ Denarii. Now in Ptolomy's geographical tables, where the degree is divided *unciatim*, after the Roman manner; this character \downarrow stands for one half; therefore being placed before the X (as on the coin) it might denote $9\frac{1}{2}$, as I before the X stands for 9. But Mr. Duane hath a gold coin with the same mark, and of the same impression as this, which weighs but $45\frac{1}{2}$ grains, though it seems to be perfect.

But these pieces are too small, and too few in number, to determine this point. Mr. Duane hath that of one Scruple, in fine preservation, weighing almost $17\frac{1}{2}$ grains. Mr. de la Nauze hath given the weight of the piece of 3 scruples with the mark ψ X in the French king's cabinet, which he says is exactly 64 Paris grains (3), equal to $52\frac{1}{2}$ Troy, and gives $17\frac{1}{2}$ grains for the Scruple.

This scrupular standard seems to have continued till Sulla introduced one which Pliny hath not mentioned, on account, perhaps, of its short duration. It was probably occasioned by the rise of the value of gold; for when the scrupular standard was first established, gold was worth but about ten times its weight in silver, as I shall shew hereafter; but in Sulla's time it was much dearer.

Cicero plainly alludes to this alteration in the coin, when, speaking of his kinsman Marius Gratidianus, he says, *At that time the money was in such a fluctuating state that no man knew what he had* (4): and both he and Pliny relate, that the law Gratidianus made in Sulla's absence from Rome, for the regulation of the coin, was so popular, that statues were erected to him in every street, and incense burnt before them (5). The intent of this law seems to have been, to restore the ancient standard in opposition to Sulla; for it so provoked him, that, on his return to Rome, he caused all the statues to be thrown down (6), and Gratidi-

(3) Memoires de l'Academie des Inscriptions, Vol. XXX. p. 359.

(4) Cicero de Officiis, L. III. § 20.

(5) Cicero, ibid. Pliny, Nat. Hist. L. XXXIII. c. 9.

(6) Pliny, L. XXXIV. c. 6.

anus to be cruelly butchered by the hand of Catiline (7).

Three coins in the Pembroke collection bear the name of Sulla, and weigh 166, 167, and 168 grains (8). Bouteroue mentions one of 204 Paris grains (9), equal to $167\frac{1}{3}$ Troy. If thirty of these were coined out of the Roman Pound, the heaviest of the four pieces gives a Pound of 5040 grains.

The standard of forty in the pound, mentioned by Pliny, seems to have succeeded to this of Sulla, and continued to the establishment of the monarchy under Augustus; for Pliny says, *Principes imminuere pondus*; and the two heaviest pieces I can find of this standard, are, one of Pompey, in whose time it seems to have been introduced, the other of Antony and Octavius, struck after the expiration of the Triumvirate, which differ but the tenth part of a grain in weight. They are both in the British Museum, in fine preservation. The former is like coin 4 Tab. XI. of the Pembroke collection; the latter like coin 11. Tab. XII. But such as bear the name Augustus, which he assumed with the monarchy, are lighter than those of the Triumvirate.

Pompey's coin weighs $128\frac{1}{2}$ Troy grains, the other $128\frac{2}{3}$. Mr. Duane hath both these coins in fine preservation, the former weighing $126\frac{1}{2}$ grains, the latter 127. Those in the Pembroke Collection weigh 125 grains each.

(7) Seneca de Ira, L. III. c. 18.

(8) Tab. VIII.

(9) Recherches curieuses des monnoyes de France. Paris, 1666. in folio.

There are besides, in the British Museum, two of 125 grains, like c. 2, and 4. in Tab. IX. of the Pembroke collection; one of $124\frac{1}{7}$ like coin 3. all very little worn; and a fourth of $124\frac{3}{7}$ grains, like c. 4. Tab. VII. which seems to be perfect. Dr. Hunter hath two perfect gold coins, one like c. 3. Tab. VIII. weighing $125\frac{1}{4}$ grains; the other like c. 2. Tab. IX. which weighs $125\frac{1}{2}$.

These ten coins give a mean Aureus of $126\frac{1}{17}$ grains.

The Pembroke collection contains forty Aurei, from Pompey to the end of the Commonwealth. One of them weighs 127 grains; two $126\frac{1}{2}$; six 126; and the rest from $125\frac{1}{2}$ to 123; except two of 121, which, being probably somewhat worn, or otherwise diminished, may safely be rejected. The remaining 38 added to the ten above-mentioned, give a mean Aureus of $125\frac{5}{17}$ grains.

But considering that thirteen of the forty-eight weigh from $128\frac{1}{2}$ to 126 grains, and that many of the rest are probably somewhat worn, we may fairly take 126 grains for the standard weight of this coin; and the number of pieces under 125 grains, that are vouched for perfect, will not allow it to be greater.

Bouteroue mentions two perfect Aurei of Julius Cæsar, each weighing 152 Paris grains; equal to $124\frac{1}{10}$ Troy. And Greaves in his first Table hath marked three of Julius for perfect, which weigh $122\frac{1}{4}$, $123\frac{7}{12}$, and $124\frac{1}{4}$ grains.

If the Aureus of forty in the Pound weighed 126 Troy grains, the Roman Pound must weigh 5040.

The weight of this coin was gradually diminished by the Emperors, till in Pliny's time forty-five were struck

struck out of the Pound. He died in the reign of Titus; and the mean Aureus of Greaves's table from Nero to that Prince, inclusive, is under 112 grains. That of the Pembroke Collection for the same period amounts to 113; but Nero's coins (contrary to Hardouin's reading of Pliny's text) appear to have been heavier than those of Vespasian or Titus.

Snellius, in his book *De re numaria*, hath given the weights of eleven Aurei, from Nero to Commodus, which he says were all as perfect as when they came from the mint. The lightest weighed 149 Dutch grains, the heaviest 153; which answer to $110\frac{1}{2}$ and $113\frac{1}{2}$ Troy. The mean taken from all the eleven, is almost 112 Troy grains.

Bouteroue found the Aureus from Nero to Septimius Severus, to weigh from 133 Paris grains to 138; that is, from $109\frac{1}{8}$ to $113\frac{1}{8}$ Troy. The mean of these two weights is $111\frac{3}{8}$ grains.

This standard continued beyond the reign of Septimius Severus; and the Pembroke coins from Nero to that time, give a mean Aureus of almost 112 grains. But we cannot suppose all of them to be perfect. Greaves's tables make it 113 $\frac{1}{2}$ for the same period; but four of his pieces of Hadrian and the Antonines weigh from $117\frac{1}{4}$ to 121 grains; which is an uncommon weight for that age, and might possibly proceed from an alteration of the standard, which did not continue long. Excluding these four, the rest give a mean Aureus of $112\frac{1}{2}$ grains..

Eisenschmid weighed a great number of such as seemed perfect to the naked eye, and found the best of them to exceed 136 Paris grains, or $111\frac{1}{2}$ Troy. But, upon examining them with a glass, they all appeared

peared somehow damaged ; which, says he, in so heavy a metal, might amount to the loss of a grain or two (1). But the loss of less than a grain is very discernible, without the help of a glass.

Upon the whole, if the standard weight of the imperial Aureus of forty-five in the Pound, did not exceed 112 grains, the Roman Pound will weigh 5040 Troy grains, as we found it from the consular Aureus.

Alexander Severus coined pieces of one half and one third of the Aureus, called Semisses, and Tremisses (2); whence the Aureus came to be called Solidus, as being their integer.

Soon after the reign of this prince, the coinage became very irregular, till Constantine entirely new modeled it, by coining 72 Solidi of four Scruples, out of the Pound of gold (3), and for the Denarius substituting the Miliarenfis, of which I shall give some account hereafter.

Greaves's second table exhibits twenty-nine of these Solidi from Constantine to Heraclius, weighing from $67\frac{1}{2}$ grains to $70\frac{1}{4}$. The mean from the twenty-nine pieces is 69 grains, which, multiplied by 72, gives but 4968 grains for the weight of the Roman

(1) Eifenschmid, p. 34.

(2) Lampridius, in Alex. Severo.

(3) Siquis solidos appendere voluerit, auri cocti VI solidos quaternorum scrupulorum, nostris vultibus figuratos, adpendat pro singulis unciis, XII pro duabus; eadem ratio servanda & si materiam quis inferat, ut solidos dedisse videatur. Cod. Theod. de Ponderatoribus, § 1. Again, Illud autem cautionis adjicimus, ut quotiescunque certa summa solidorum pro tituli quantitate debetur, & auri massa transmittitur, in LXXII solidos libra feratur accepta. Cod. Justin. L. X. Tit. 70. de Susceptoribus, § 5.
Pound.

Pound. But if the standard weight of this coin amounted to 70 grains, the Pound will weigh 5040, agreeable to what we found it from the Aurei.

The Pembroke Collection contains 57 of these pieces from Constantine to Justinian. Five of them amount to 70 grains, and 29 to 69; the rest are lighter, even to 64 grains. But we do not know what preservation they are in. And unless the standard weight of this coin amounted to 70 Troy grains, Constantine's Pound must have been somewhat deficient of the ancient Standard.

Having thus given as compleat an account of the Roman gold, as I have been able to collect from authors of credit, and my own observation, I shall proceed to examine the evidence we have of the weight of their silver money.

The Consular silver is so unequal, that the Romans must have been very negligent in sizing their pieces. Villalpandus tells us, that weighing many Denarii of the same form, inscription, and apparent magnitude, and so like to each other, that they seem to have been struck, not only in the same age, but even on the same day, he found them to differ in weight, 5, 9, or 10 grains from each other (4).

There is a piece in the Pembroke Collection, Coin 2. P. 3. Tab. 18, with the head of Roma, and X, the mark of the Denarius, on one side, on the other

(4) Cum plures Denarios appenderemus ejusdem formæ, inscriptionis, & penè magnitudinis, atque ita similes, ut non solum eodem tempore, sed eodem prorsus die, percussos fuisse conjiceret, tamen eos deprehendimus quinis, novenis, aut denis granis ponderare a se invicem distare. Villalp. De apparatu urbis & templi, p. 357. Ten Roman grains are equal to about $7\frac{1}{2}$ Troy.

Castor and Pollux, with R O M A in the exergue which weighs 81 grains. Another with the like impress on each side, and V the mark of the Quinarius behind the head, which weighs 33 grains. A third in the same page hath the mark XVI behind the head of Roma, a biga on the reverse, with R O M A in the exergue, which weighs but 54 grains. As these pieces seem to be exhibited chiefly on account of their uncommon weight, we must suppose the lightest to be perfect.

In the British Museum is a coin like the tenth in P. 3. Tab. 2. of the Pembroke Collection, which weighs above 73 grains. Another like the second in P. 3. Tab. 18, which weighs $66\frac{1}{2}$ grains; and a third, which seems perfect in all respects, with the head of Roma and X on one side, on the other a Quadriga with the inscription C N. G E, which weighs but 55 grains.

It is difficult to account for these differences in the weight of the same coin, especially as Pliny seems to have been ignorant of such inequalities; for he tells us of an Eastern King, that wonderfully admired the justice of the Romans in coining all their Denarii of the same weight, though the impresses shewed them to be the money of different Emperors (5). Perhaps the King only admired the invention of coining, which was not known in his country; but Pliny, who tells the story, certainly supposed all the Denarii were of equal weight.

Perhaps the heavy pieces of 73 and 81 grains were struck at the mint for private persons, to give

(5) Pliny, Nat Hist. L. VI. c. 22.

away in presents on Birth-days, and New-years, as was the custom at Rome; and some of them may be modern forgeries: but the light pieces of 54 and 55 grains, must have been owing to the negligence or roguery of the coiners; though some of these too may be counterfeits.

The following Table exhibits the weights of forty-six of the fairest Denarii in the British Museum. Such of them as are marked with two dots, are a little worn, though very little. The Bigati and Quadrigati are distinguished by the letters B. and Q.

Troy grains	
66,5 :	61,15
66,1	61,12 :
64,15 :	61,12
63,33	61,1 : Q
63,15 :	61,07 : B
63,07 :	60,85 :
63,05	60,75
62,7	60,5 : B
62,43 : Q	60,33 : B
62,27	60,3 : Q
61,95	60,2 B
61,93 :	60,05
61,8 :	59,95 :
61,8 B	59,15 : B
61,73 :	58,92 : Q
61,73 :	58,85 :
61,55 : Q	58,67 : Q
61,52 Q	58,2 Q
61,5 :	58,15
61,5	57,37 :
61,35	56,87 :
61,33	56,55 Q
61,2	55,0 Q

46) 2803,86 Sum total.
60,95 Mean Denarius.

The mean weight of the Denarius from all these pieces is 60,95 Troy grains; therefore, had all of them been perfect, it might have exceeded 61 grains. But the mean from the twenty-one that are so, amounts but to 60,92. Either of them comes very near to what Eifenschmid found it by the like method; though he rejected some pieces for no other reason but because he thought them too light.

But a mean from pieces so unequally sized is not to be relied on. And it may be questioned whether those of above 63 grains ever passed as common coin. Greaves, who had examined many hundred Denarii Conulares, says the best amounted to 62 grains; but had he met with any of 63, or even of $62\frac{1}{2}$, it cannot be doubted that he would have mentioned them in support of his Denarius of $62\frac{4}{7}$ grains from the Congius. Therefore the pieces of 63 grains and upward must be very uncommon, whereas they make above a seventh part of the number in this table.

Hence I conclude, that the mean derived from this table is of very small authority.

But if we take 5040 Troy grains for the weight of the Roman Pound, as determined from the Gold coins; the scruple will weigh $17\frac{1}{2}$ grains; the Consular Aureus, 126; the Imperial Aureus, 112; and the Solidus, 70: all which are probable weights of the several Coins; and the Consular Denarius of 84 in the Pound will weigh just 60 Troy grains.

And this must be very near its true standard weight; for were we to add only half a grain to it, the Consular Aureus would exceed 127 grains, which is certainly too great a weight for that coin.

Though Pliny gives no particular account of any alteration in the weight of the Denarius, it was undoubtedly diminished by the Emperors as well as the Aureus, though by what degrees is uncertain; for Galen tells us, that the writers on weights and measures differed in the number of Drachms [*Denarii*] they assigned to the Ounce; most of them making it to contain $7\frac{1}{2}$, some but 7, and others 8 (6). The later writers make it contain 8 Denarii, of 3 scruples each (7).

Greaves “ found by examining many Imperial
“ Denarii, that from Augustus’s time to Vespasian
“ they continually almost decreased, till, from being
“ the seventh part of the Roman Ounce, they came
“ now to be the eighth part: and therefore 96 were
“ coined out of the Roman Libra, whereas before,
“ under the Consuls, 84. From Vespasian to Alex.
“ Severus, as far as he had observed, the Silver con-
“ tinued at a kind of stay in respect of weight, ex-
“ cepting only such coins as upon some extraordi-
“ nary occasion, both then, and in the first Emperors
“ time, were stamped, either in honour of the Prince,
“ or of the Empress and Augusta familia, or else in
“ memory of some eminent action. These last most
“ usually were equal to the Denarii Consulares, and
“ many of them had these characters EX. S. C, or
“ else S. P. Q. R. Under Severus and Gordianus,
“ the Denarii began to recover their primitive weight,
“ but most commonly with a notable abasement,
“ and mixture of allay (8).” Eifenschmid hath

(6) Galen, de med. comp. sec. genera, L. III. c. 3.

(7) Rhemnius Fannius, Cleopatra, Dioscorides, &c.

(8) Greaves, p. 113.

given the like account of the Imperial Denarius, and says he found its weight from Nero to Sept. Severus, to be to the Consular Denarius in the proportion of 7 to 8 (9).

Having determined the weight of the ancient Roman Pound from the gold coins, to be 5040 Troy grains, it seems requisite to say something concerning the heavy weights exhibited by Gruter and Fabretti, which are irreconcilable to every other evidence.

Those with inscriptions are not older than the reign of Augustus; but neither his coins, nor those of his successors, will by any means answer to such standards.

Fabretti's mean pound of 5500 Troy grains, exceeds Auzout's mean Pound from the Congius by above three fourths of the antient Roman Ounce, though that vessel is greater than can be derived from the greatest probable measure of the antient Roman foot.

The weight of spring-water contained in the cube of half that foot (which was the legal measure of the Congius) is thus determined.

According to Eifenschmid's Table of specific gravities (1), a cubic Paris inch of spring-water should weigh 374 Paris grains in winter, when liquors are heaviest. Therefore the cube of half the Paris foot (or 216 cubic Paris inches) must weigh 80784 such grains.

The greatest probable measure of the antient Roman foot, does not exceed 974 such parts as the Paris foot contains $1065\frac{2}{3}$ (2).

(9) Eifenschmid, p. 33.

(1) Eifenschmid, p. 175.

(2) See the Discourse on the Roman Foot, Phil. Trans. Vol. LI.
And

And as the cube of the Paris foot, is to the cube of the Roman foot, so are 80784 Paris grains, to 61725½ such grains, the weight of the spring-water contained in the cube of half the Roman foot.

But 61725½ Paris grains, are equal to 50634 Troy; therefore the Roman Pound, according to this calculation, should weigh 5063½ Troy grains, exceeding that derived from the coins, but by 23½ such grains.

If, on the other hand, we take Fabretti's Pound of 5500 Troy grains (equal to 6704½ Paris) and reckon the weight of a cubic Paris inch of spring-water 374 Paris grains (as before), a Congius of ten such Pounds will require a Roman foot of 1001 such parts as the Paris foot contains 1065½; which exceeds any probable measure of that foot.

Thus these heavy weights neither agree with the Roman money nor with the Congius; which is a circumstance not easily to be accounted for, as the authorities for the larger Pound are indisputable, and we do not know that the Romans used two weights like our Troy and Averdupois.

The Denarius continued to be the current silver money of the Empire, till Constantine substituted the *Miliarensis* in its stead.

The price of gold had been increasing a considerable time before his reign, which made a new regulation of the money necessary. For this purpose, Constantine divided the Pound of gold into seventy-two *Solidi* (3), which was a more commodious

(3) See the Theod. and Justinian Codes quoted in p. 504.

number than either 40 or 45, as it divided the Ounce and half Ounce without a fraction. He likewise altered the weight of the silver coin, and fixed the price of the Pound of gold at 1000 pieces of his new silver, which were thence called *Miliarenfes* (4). This he seems to have done in imitation of the ancient coinage; for when the *Aureus* of forty in the Pound passed for 25 *Denarii*, the Pound of gold passed for 1000.

But it was attended with this inconvenience, that his *Solidus* could not be exchanged for its true value in silver; for 1000 divided by 72 is $13\frac{8}{9}$; but it passed for 14 (5), which was more than it was worth, and made two prices of gold at the same time; one the legal price of 1000 *Miliarenfes* for the Pound; the other, the current price, of 14 for the *Solidus*, which must have occasioned disputes in the payment of small sums.

To remedy this inconvenience, it was thought proper to alter the weight of the silver money, and having fixt the price of the Pound of silver at five *Solidi* (6), to coin 60 pieces out of it (7); which

(4) *Μιλιαρήσιον, τὸ χιλιοστὸν τῆς τῆ χρυσῆς λίτρας· μίλη γὰρ οἱ Ῥωμαῖοι τὰ χίλια καλεῖσσι, καὶ ἔτω κατεκερματῶσαν τὸ πῶσον τῆς λίτρας, ἵνα δι' αὐτῆς σώζῃται τὰ χίλια μιλιαρήσια, ὥστε κατὰ νόμισμα λαβέανεν μιλιαρήσια ἰδ'.* Glossæ nomicæ, quoted by Gronovius, L. IV. c. 16. de pecunia vetere.

(5) See the preceeding note.

(6) *Jubemus ut pro argenti summa quam quis thesauris fuerit illaturus, inferendi auri accipiat facultatem, ita ut pro singulis libris argenti, quinos Solidos inferat.* Cod. Theod. De argenti pretio, & Cod. Justin. L. X. Tit. 76.

(7) *Cum publica celebrantur officia, sit sportulis nummus argenteus,—nec majorum argenteum nummum fas sit expendere,*

retained

retained the name Miliarenfes, though the Pound of Gold was worth but 864.

A scholiast on the Basilics tells us, that " One Siliqua [*of gold*] is worth 12 Folles [*of copper*], or half a Miliarenfis: therefore 12 Siliquas are half a Solidus, for the whole Solidus is worth 12 Miliarenfes, or 24 Siliquas (8)." The Roman Pound contained 1728 Siliquas (9), therefore there were 72 of these Solidi in the Pound; and each of them being worth 12 Miliarenfes, the Pound of silver, which was valued at 5 Solidi, must have contained 60 Miliarenfes.

How many Miliarenfes Constantine coined out of the Pound of silver is no where said; but if the price of Gold was nearly the same in his reign, as when 5 Solidi were worth a Pound of silver, the Pound must have been worth $14\frac{2}{3}$ Pounds of silver; and 1000 divided by $14\frac{2}{3}$, gives $69\frac{4}{5}$ for the number of Miliarenfes coined out of the Pound. Therefore it is probable Constantine's number was either 69 or 70. If the former, each piece should weigh $73\frac{8}{23}$ Troy grains; if the latter, $72\frac{1}{10}$.

Eisenfchmid found the larger silver of Constantine to come up to 90 Paris grains, or $73\frac{8}{100}$ Troy; but the smaller (which should be its half) seldom amounted to 40 Paris grains, or $32\frac{4}{5}$ Troy; which

quam qui formari solet, cum argenti libra una in argenteas sexaginta dividitur. Cod. Theod. De expensis ludorum.

(8) Χρὴ γινώσκειν ὅτι τὸ ἐν κεράτιον φύλλας εἰς ἰβ', ἥτοι μιλιαρησίς τὸ ἥμισυ· τὰ ἐν ἰβ' κεράτια εἰς νομισμὰτ' ἥμισυ· τὸ δὲ ἀκέραιον νόμισμα ἔχει μιλιαρῆσια ἰβ', ἥτοι κεράτια κδ'. Schol. in L. XXIII. Βασιλικῶν, apud Gronov. L. IV. c. 16. De pecunia vetere.

(9) See Rhemnius Fannius, and others.

leaves it uncertain whether 69 or 70 of these Miliarenfes were coined out of the Pound. If 69, the proportion of gold to silver was almost $14\frac{1}{2}$ to 1; if 70, $14\frac{2}{7}$ to 1.

In the *Glossæ nomicæ*, quoted by Gronovius and others, we have an attempt to settle the exchange between the two Miliarenfes and the Solidus. The Glossographer, giving an account of the different sums called Folles, says, “ There is likewise another
“ Follis, consisting of the smaller silver which was
“ paid to the soldiers, and thence called Miliarenfes,
“ each of which is worth $1\frac{3}{4}$ Siliquas [*of gold*], and
“ the Follis contains 125, which make 218 Siliquas
“ and 9 nummi; or 109 of the Miliarenfes now
“ current and 9 nummi; which are worth 9 Solidi,
“ 1 Miliarenfis, and 9 nummi, and the Purse of 125
“ pieces of this lesser silver, was called a Follis (1.)”

This Gloss appears to come from a different hand from that before quoted, by the absurd etymology here given of the word *Μιλιαρήσιον*; and the author did not understand his subject. For the Miliarenfis of 60 in the Pound, was undoubtedly worth 2 Siliquas of gold, and if Constantine’s was worth $1\frac{3}{4}$ when this Glossographer wrote, the two coins must have been in the proportion of 8 to 7, and the exchange

(1) Ἐστὶ δὲ καὶ ἕτερον φόλλις συναγόμενον ἐξ ἀργυρίων λεπτῶν, τῶν τοῖς στρατιώταις διδομένων, καὶ διὰ τῆτο μιλιαρησίων καλεσμένων· ἔχει δὲ ἑκασον τῶν τοιαύτων λεπτῶν ἀργυρίων κεράτιον ἓν, ἥμισυ, τέταρτον· ὁ δὲ φόλλις, ἀργύρια τοιαῦτα ρκέ. ἃ ποιεῖσι κεράτια σή, καὶ νέμμεες θ'. ἥτοι, πρὸς τὸ νῦν κρατῆν, μιλιαρῆσια ρθ'. καὶ νέμμεες θ'. γινόμενα ἐν χαράγμασι νομίσμασι θ', μιλιαρῆσιον ἓν, καὶ νέμμεες θ'. τὰ τοῖνυν ρκέ ἀργύρια συνήγelo εἰς ἀπόδεσμον ἓνα, καὶ ἔτι ἐκαλεῖτο φόλλις. *Glossæ nomicæ apud Gronov. L. IV. c. 16.*

made

made in smaller numbers without fractions; for 7 Solidi being worth 84 of the new Miliarenfes, would exchange for 96 of Constantine's.

But this Follis of 125 Miliarenfes, feems to have been intended for a more correct adjustment of Constantine's filver to his gold than 14 Miliarenfes for the Solidus; for it was the true value of 9 Solidi, which, at the rate of 14 for the Solidus, fhould have exchanged for 126, which was one more than they were worth. And nine was the leaft number of Solidi that could be exchanged for their true value in Constantine's filver; which this gloffographer feems not to have known. For the Roman Pound containing 1728 Siliquas, Constantine's Miliarenfis was worth but the thousandth part of them, or $1\frac{7}{10000}$, which multiplied by 125 make juft 216 Siliquas without a fraction, which were equal to 9 Solidi. Or, fupposing the proportion of Gold to filver the fame when the new Miliarenfes were coined, as when the old ones were, 1000 of the latter and 864 of the former, being each worth a Pound of gold; divide both numbers by 8, and we fhall have 125 of the old, worth 108 of the new, which paffed for 9 Solidi.

Having mentioned the Follis, I fhall endeavour to explain what it was. The word is Latin, and it anciently fignified a little bag, or purfe; whence it afterward came to be ufed for a fum of money, and very different fums were called by that name. Thus, the Scholiaft on the Basilics mentions a Follis which was worth but the 24th part of the Miliarenfis; the Gloffæ nomicæ, one of 125 Miliarenfes, and another of 250 Denarii (which was the ancient Sestertium);

and three different sums, of 8, 4, and 2 pound of gold, were each called a Follis (2).

The Glossographer last quoted makes 9 Nummi equal to $\frac{3}{4}$ of a Siliqua; for $1\frac{3}{4}$ multiplied by 125, is 218 $\frac{3}{4}$, which he calls 218 Siliquas, and 9 nummi. Therefore 12 nummi were equal to a Siliqua; but the scholiast on the Basilics makes 12 Folles equal to a Siliqua; consequently, this Nummus and the scholiast's Follis are the same.

The Scholiast tells us, the Miliarenfis was equal to 24 Folles of copper, therefore the Ounce of silver containing 5 Miliarenfes of 60 in the pound, was worth 120 such Folles.

The Glossographer, describing a Follis of 250 Denarii, says, it was equal to 312 Pounds, 6 Ounces of copper (3). The Denarius of that age was the eighth part of an Ounce, therefore an Ounce of silver must have been worth 120 Ounces of copper.

But according to the Scholiast, the Ounce of silver was worth so many Folles; therefore the Scholiast's Follis was an Ounce of copper. And this Follis being equal to the Glossographer's Nummus, that Nummus was likewise an Ounce of copper.

By a Rescript of Arcadius and Honorius in the Theodosian Code, the treasury was impowered to

(2) See the Glossæ nomicæ, quoted by Gronovius near the end of c. 16. of L. IV.

(3) Φόλλις σταθμός ἐστὶ, λεγόμενος καὶ βαλανίον· ἔλκει δὲ δλωάρια διακόσια πενήκοντα, ταῖς ἑστὶ λίτρας τιτ', καὶ ὀγγίας ἑξ, ὡς ἔχον· ἐκάστη δλωαρίε λίτραν α' καὶ ὀγγίας γ'. Glossæ nomicæ, apud Gronov. L. IV. c. 16.

receive a Solidus for 25 Pounds of copper (4), which sets the price of that metal at the 125th part of its weight in silver. But the same Rescript in Justinian's Code (5) for XXV *libris æris*, hath XX *libris æris*. Both cannot be right, perhaps neither; and the true reading may be XXIV *libris æris*, agreeable to these commentators.

Eisenschmid found Constantine's copper money to weigh a quarter of a Roman Ounce (6); therefore the Scholiast's Follis, and the Glossographer's Nummus contained four of them, as the ancient Nummus contained four *Asses*; but whereas the Denarius formerly passed for four Nummi, it now passed for 15, and the writers of this age say it passed for 60 *Asses* (7).

§ 4. *Of the value of Gold in Greece and Rome.*

Herodotus reckons the value of gold to silver in the proportion of 13 to 1 (1). Plato, who wrote about fifty years after him, says it was 12 times the value of silver (2); and Xenophon, Plato's contemporary, relates, that Cyrus paid Silanus the Ambraciot 3000 Darics for the ten talents he had promised

(4) *Æris pretia quæ a provincialibus postulantur, ita excipi volumus, ut pro XXV. libris æris, Solidus a possessore reddatur.* Cod. Theodof. de collatione æris.

(5) Cod. Justin. L. X. Tit. 29.

(6) Eisenschmid, p. 141.

(7) Hero, Epiphanius, &c.

(1) Herodotus, L. III. § 95.

(2) Plato in his Hipparchus.

him

him (3); which being Babylonian talents, agrees with Plato's estimate, as I have shewn above.

After the conquest of Asia by Alexander, the immense treasures of the Kings of Persia circulating in Asia and Greece, reduced the price of gold to ten times its weight in silver, at which it seems to have continued two hundred years, or more.

The Romans did not coin gold till above a hundred years after the death of Alexander: and Pliny gives the following account of its first coinage. *Aureus nummus post annum LXII percussus est quam argenteus, ita ut scrupulum valeret Sestertiis vicens: quod effecit in libras, ratione Sestertiorum qui tunc erant, Sestertios DCCCC* (4). Now if the Scruple was valued at 20 Sesterces, the Pound, instead of being worth 900, must have been worth 5760 such Sesterces: but if for *Sestertios DCCCC*, we read *Denarios DCCCC*, the account will be clear and intelligible. The words *ratione Sestertiorum qui tunc erant*, imply that the Sesterce of that age was different from the Sesterce of Pliny's time: but the quarter of the silver Denarius, or Nummus Sestertius of 4 *Asses*, was the same at both times, and we know of no other Sesterce but the ancient one of $2\frac{1}{2}$ *Asses*. Twenty such Sesterces make 50 *Asses* for the value of the Scruple of gold; which multiplied by 288 (the number of Scruples in the Roman Pound) give 14400 *Asses* for the value of the Pound of Gold. And reckoning 16 *Asses* to the *silver* Denarius (which it passed for at the time of this coinage) 14400 *Asses*

(3) Xenophon in his Expedition of Cyrus, L. I.

(4) Pliny Nat. Hist. L. XXXIII. c. 3.

make just 900 such Denarii; which is Pliny's number.

That the Romans kept their accounts in copper Sesterces of $2\frac{1}{2}$ *Affes*, long after the silver Sesterce passed for 4, appears not only from this passage, but from what Pliny says of the pay of the Army, that notwithstanding the *silver* Denarius passed for 16 *Affes*, it was paid to the soldier for 10: which implies that the Quæstor's accounts were kept in copper money, as all the public accounts probably were. Cæsar is said to have doubled the pay of the soldiers (5), and it appears from the account Tacitus gives of the mutiny of the legions in Pannonia (6), that at the accession of Tiberius to the empire, their pay was but ten *Affes* a day; and they demanded a Denarius, not upon pretence that the legionary soldiers had ever received so much, but that ten *Affes* were not an equivalent for the dangers and hardships a soldier underwent. Hence 5 *Affes* appear to have been their pay before Cæsar raised it; but if this was their pay on the Quæstor's book, they actually (according to Pliny) received a Quinarius of 8 *Affes*, and Cæsar only nominally doubled it; which is more probable than that their pay at the time he raised it, should be under two-pence three-farthings English a day. Polybius tells us, that in his time the pay of a Roman foot soldier was two Oboles a day; that of a centurion twice as much; and that of a horseman a Drachm (or Denarius) (7). This must be understood of what

(5) Suetonius in Julio, c. 26.

(6) Taciti Annal. L. I. § 17.

(7) Polybius, L. VI. p. 484 of Casaubon's edition.

they received, not of their nominal pay on the Quæstor's book. The foot soldier, therefore, was paid at the rate of $5\frac{1}{3}$ *Asses* a day, which, in a country where a traveller might have his lodging and all necessaries on the road for half an *As* (8), would be great pay, had not their cloathing, arms, and tents, been deducted out of it, as they were (9). But both the public and private riches of the Romans were increasing very fast when Polybius wrote, and the prices of all the necessaries of life must have increased in proportion, therefore it is probable that the soldier's pay was raised to 5 *Asses* on the Quæstor's book, for which they received a *Quinarius*, before Cæsar augmented it.

If the Pound weight of gold was worth 900 Denarii, 84 of which were coined out of the Pound of silver, the value of gold to silver must have been in the proportion of 900 to 84, or as $10\frac{5}{7}$ to 1. And if this was the value of gold at Rome sixty-two years after their first coinage of silver, it proves that no fewer than 84 Denarii were then coined out of the Pound. Now by an article in the treaty with the Etolians, about eighteen years after this first coinage of gold at Rome, that people were permitted to pay one third of their tribute in gold, at the rate of one Pound of gold for ten of silver (1). Therefore gold was then but ten times the value of silver in Greece; and it could not be much higher at Rome, where silver was esteemed the more useful metal, as appears by the limitation of the sum to be paid in gold, to one

(8) Polybius, L. II. p. 103.

(9) Polybius, L. VI. p. 484. Taciti Annal. L. I. § 17.

(1) Polybius, Excerpt. Legat. § 28. Livy L. XXXVIII.

third of the whole; and Pliny observes, that the Romans always required the tribute they imposed on conquered countries should be paid in silver, not in gold (2); therefore it is not probable that gold should bear a much higher price at Rome than elsewhere, as it would, according to this account of its first coinage, if fewer than 84 Denarii were coined out of the Pound of silver.

There is another passage in Pliny relating to the value of gold, which requires correction. Speaking of the Byssine thread, he says, *Quaternis denariis scripula ejus permutata quondam, ut auri, reperio* (3). When 96 Denarii were coined out of the Pound, each of them weighed 3 Scruples; therefore 4 Denarii weighed 12 Scruples, which was nearly the value of a Scruple of gold when Pliny wrote. But Pliny knew no such Denarius; for he says, the lawful weight of that coin was the eighty-fourth part of the Pound; besides, he speaks here of former times. Therefore for *Quaternis*, we should read *Ternis*; for 3 Denarii of 84 in the Pound weighed $10\frac{2}{7}$ Scruples, which was nearly the ancient value of a Scruple of gold.

From a passage in Tacitus, compared with Suetonius, we learn that in Galba's time the Aureus passed for 25 Denarii; the former says — *ut per speciem convivii quoties Galba apud Othonem epularetur, cohorti excubias agenti viritim centum nummos divideret*; which the latter expresses thus, *quoties cœnâ principem exciperet, Aureos excubanti cohorti viritim dividebat* (4). But 100 Nummi were equal to 25 Denarii; there-

(2) Pliny, Nat. Hist. L. XXXIII. c. 3.

(3) L. XIX. c. 1.

(4) Taciti Hist. L. I. § 24. Suetonius in Othone, c. 4.
See also Dio Cassius, L. LV.

fore when 40 Aurei were coined out of the Pound of gold, and 84 Denarii out of the Pound of silver, the Pound of gold passing for 1000 Denarii, was worth $11\frac{1}{2}$ Pounds of silver.

When the Aureus of 45 in the Pound passed for 25 Denarii of 96 in the Pound, the proportional value of gold to silver was as 375 to 32, or a little under $11\frac{3}{4}$ to 1.

Suetonius tells us, that Cæsar brought so great a quantity of gold from Gaul, that he sold it throughout Italy and the Provinces for 3000 nummi the Pound (5). 3000 nummi make 750 Denarii; and 750 is to 84, as $8\frac{1}{4}$ to 1. This was its price as merchandize, when the market was overstocked, and the seller in haste to dispose of his goods; but what effect it had on the coin, we do not know.

By the diminution of the Aureus for above half a century before the reign of Constantine (6), the price of gold appears to have been rising, till it came to above 14 times its weight in silver; for five Solidi of 72 in the Pound, being valued at a Pound of silver (7), the proportion between the two metals was as $14\frac{2}{5}$ to 1.

§ V. *Of the value of the ancient Greek and Roman money.*

IT does not appear that either the ancient Greeks or Romans allayed their money, but coined the

(5) Suetonius in Julio, c. 54.

(6) See the Pembroke Collection, from Tab. XX. to XXIV.

(7) See Cod. Justinian. L. X. Tit. 76. quoted above.

metals as pure as the refiners of those times could make them : for though Pliny mentions two instances of the contrary at Rome (1), the example was not followed, till the later Emperors debased the coin : and his expression, *miscentur æra falsæ monetæ*, shews he thought the practice illegal.

Though the ancients had not the art of refining silver, in so great perfection as it is now practised, yet, as they mixed no base metal with it, and esteemed what they coined to be fine silver, I shall value it as such.

Sixty-two English Shillings are coined out of 11 ounces 2 p. wt. Troy of fine silver, and 18 p. wt. alloy. Therefore, the Troy grain of fine silver is worth $\frac{62}{111}$ ths of a Farthing. Hence the Attic Drachm of $66\frac{1}{2}$ grains will be found worth a little more than Ninepence farthing; the Obolæ, a little more than Three halfpence; and the Chalcus, about $\frac{2}{9}$ of a Farthing.

But, for the reduction of large sums to English money, the following numbers are more exact.

	£.	s.	d.
The Attic Drachm	0.	0.	9,286
The Mina	3.	17.	4,6
The Talent	232.	3.	0.

Hence the Mina expressed in Pounds Sterling and decimals of a Pound will be £. 3,869; the Talent £. 232,15.

The Romans reckoned by *Asses* before they coined silver, after which they kept their accounts in Sesterces. The word Sestertius is an adjective, and signi-

(1) Pliny Nat. Hist. L. XXXIII. c. 3. & c. 9.

fies two and a half of any substantive to which it refers. In money matters its substantive is either *As*, or *pondus*; and *Sestertius As*, is two *Affes* and a half; *Sestertium pondus*, two *pondera* and a half, or 250 *Denarii* (2).

When the *Denarius* passed for ten *Affes*, the *Sesterce* of $2\frac{1}{2}$ *Affes* was a quarter of it; and the Romans continued to keep their accounts in these *Sesterces* long after the *Denarius* passed for sixteen *Affes*; til, growing rich, they found it more convenient to reckon by quarters of the *Denarius*, which they called *Nummi*, and used the words *Nummus* and *Sestertius*, indifferently as synonymous terms, and sometimes both together, as *Sestertius nummus*; in which case, the word *Sestertius*, having lost its original signification, was used as a substantive.; for *Sestertius nummus* was not two *Nummi* and a half, but a single *Nummus* of four *Affes*.

They called any sum under 2000 *Sesterces* so many *Sestertii*, in the masculine gender; 2000 *Sesterces* they called *duo* or *bina Sestertia*, in the neuter; so many quarters making 500 *Denarii*, which was twice the *Sestertium*; and they said *dena*, *vicena*, &c. *Sestertia*, till the sum amounted to a thousand *Sestertia*, which was a million of *Sesterces*. But, to avoid ambiguity, they did not use the neuter *Sestertium* in the singular number, when the whole sum amounted to no more than 1000 *Sesterces*, or one *Sestertium*.

They called a million of *Sesterces* *Decies nummum*, or *Decies Sestertium*, for *Decies centena mil-*

(2) See Gronovius, *De pecunia vetere*, L. I. c. 4.

lia nummorum, or Sestertiorum (in the masculine gender) omitting centena millia, for the sake of brevity: they likewise called the same sum Decies Sestertium (in the neuter gender), for Decies centies Sestertium, omitting Centies for the reason above-mentioned; or simply Decies, omitting centena millia Sestertiũ, or centies Sestertium; and with the numeral adverbs, Decies, Vicies, Centies, Millies, and the like, either centena millia, or centies, was always understood.

These were their most usual forms of expression, though for Bina, Dena, Vicena Sestertia, they frequently said, Bina, Dena, Vicena millia nummũ (3); and Cicero, in the passage quoted in the margin, hath used Mille Sestertia, for Decies Sestertium. But Gronovius says, that expression is not to be found elsewhere, and supposes it to be a false reading.

If the Consular Denarius contained 60 Troy grains of fine silver, it was worth somewhat more than Eightpence farthing and a half Sterling; and the *As*, of sixteen to the Denarius, a little more than a Half-penny.

To reduce the ancient Sesterces of $2\frac{1}{2}$ *Asses*, when the Denarius passed for 16, to pounds Sterling, multiply the given number by 5454, and cut off six figures on the right hand for decimals.

To reduce Nummi Sestertii, or quarters of the Denarius, to pounds Sterling; if the given sum be Consular money, multiply by 8727, and cut off

(3) Suetonius in Julio, c. 38. Cicero in Verrem, L. I.
§ 14.

fix figures on the right hand for decimals; but for Imperial money, diminish the said product by one eighth of itself.

For example, Cicero says, Verres had received *Vicies, ducenta triginta quinque millia, quadringentos decem & septem nummos*, or 2.235.417 Sesterces: this being Consular money, multiply by 8727, and cutting off six figures from the product, £. 19508,484159, or 19508 *l.* 9 *s.* 8 *d.* will be their value in English money.

Again, Suetonius relates, that when Vespasian came to the Empire, he found the treasury so exhausted, that he declared *Quadringenties millies*, or 40.000.000.000 nummi, were wanted to support the Government (4). This was Imperial money, which, multiplied by 8727, and cutting off six figures from the product, gives 349.080.000
One eighth of which, 43.635.000

being subtracted, leaves £. 305.445.000 Pounds Sterling.

But Budæus supposes, that for *Quadringenties millies*, we should read *Quadragies millies*, which reduces it to £. 30.544.500, and is a much more probable sum.

If the *Miliarenfes* of 60 in the pound were fine silver, and weighed 84 Troy grains, they were worth 46,918918 . . . Farthings and decimals, or almost 11 pence 3 farthings Sterling; and the *Solidus* passing for 12 of them, was worth a little more than 11 *s.* 8 *d.* 3 *f.*

The Pound of gold was worth 864 of these *Miliarenfes*, amounting to 40537,94 Farthings and de-

(4) Suetonius, in *Vespasiano*, c. 16.

cimals, which, divided by 1000, give 40,538, or above 10 pence and half a farthing for the value of Constantine's Miliarensis in English money.

The Constantinopolitans kept their accounts in Solidi, which are reduced to pounds Sterling, by multiplying the given number by 58648, and cutting off five figures on the right hand for decimals.

CONCLUSION.

THE Greeks had no money at the time of the Trojan war; for Homer represents them as trafficking by barter (1), and Priam (an Asiatic) weighs out the ten talents of gold, which he takes to ransom his son's body of Achilles (2).

This ponderal Talent was very small, as appears from Homer's description of the Games at the Funeral of Patroclus, where two Talents of gold are proposed as an inferior prize to a mare with foal of a mule. Whence I conclude it was the same that the Dorian Colonies carried to Sicily and Calabria; for Pollux tells us, from Aristotle, that the ancient Talent of the Greeks in Sicily contained 24 Nummi, each of which weighing an Obol and a half, the Talent must have weighed six Attic Drachms, or three Darics; and Pollux elsewhere mentions such a Talent of gold. But the Daric weighed very little more than our Guinea; and if 2 Talents weighed about 6 Guineas, we may reckon the mare with foal worth 12; which was no improbable price, since

(1) *Iliad* H. ver. 472.

(2) *Iliad* Ω. ver. 232.

we learn from a passage in the *Clouds* of Aristophanes, that, in his time, a running horse cost 12 Minas, or above 46 pounds Sterling.

Therefore, this seems to have been the ancient Greek Talent, before the art of stamping money had introduced the greater Talents from Asia and Egypt.

Herodotus tells us, the Lydians were reputed to be the first that coined gold and silver money (3); and the Talent, which the Greeks called Euboïc, certainly came from Asia. Therefore, the Greeks learned the use of money from the Asiatics.

The Romans took their weights and their money, either from the Dorians of Calabria, or from Sicily; for their *Libra*, *Uncia*, and *Nummus*, were all Doric words, their *Denarius* was the Sicilian *Δεκάλητρον*; and Pollux tells us, from Aristotle, that the Sicilian *Nummus* was a quarter of the Attic Drachm (4); and the Romans called a quarter of their *Denarius* by the same name.

The weights I have produced of the Greek and Roman coins, so fully prove the ancient Attic Drachm to have been heavier than the *Denarius*, that it may seem superfluous to quote any authorities in support of their evidence: nor should I do it here, but in order, at the same time, to answer an objection which may be made to the weight I have assigned to the Attic Drachm.

In the treaty between the Romans and Antiochus, recorded by Polybius and Livy (5), the weight of

(3) Herodot. L. I. § 94.

(4) See Pollux, L. IX. c. 6. § 80, 81. 87. & L. IV. c. 24. § 175.

(5) Polybius, Excerpt. Leg. § 35. Livy, L. XXXVIII. c. 38.

the Euboïc talent is set at 80 Roman Pounds. The Talent is not, indeed, called Euboïc, in the Treaty, which was superfluous when its weight was specified; but both historians, in relating the terms offered by Scipio to Antiochus, on which this treaty was founded, call it so (6). Therefore in Livy's recital of the treaty, for *Argenti probi XII millia Attica talenta*, we should read, with Gronovius, *Argenti probi Attici XII millia talenta*.

In § II of this discourse, I have endeavoured to prove that the Euboïc Talent was equal to the Attic; and if so, it contained 6000 Attic Drachms; but 80 Roman pounds contained 6720 Denarii; therefore, according to this treaty, the weight of the Attic Drachm must be to that of the Denarius, as 6720 to 6000.

And, even if the Euboïc Talent was heavier than the Attic, in the proportion of 72 to 70, the Attic Drachm would still be heavier than the Denarius; for in that case, the Euboïc talent should contain 6171 Attic Drachms, and the two coins would be in the proportion of 6720 to 6171.

But an anonymous Greek fragment published by Montfaucon (7), makes 100 Attic Drachms equal to 112 Denarii; which proportion of the two coins being the same with that of 6000 to 6720, seems to have been taken from this treaty; and if it was, that writer certainly thought the Talent therein mentioned, equal to the Attic.

(6) Polyb. Exc. Leg. § 24. Livy, L. XXXVII. c. 45.

(7) *Analecta Græca*, p. 393. Paris, 1688, in Quarto.

This proportion, however, does not agree with the weights I have assigned to the two coins; for if the Denarius weighed 60 Troy grains, and the Attic Drachm $66\frac{1}{2}$, 6650 Denarii should weigh 6000 Attic Drachms, or a Talent; but this number of Denarii is deficient of 80 Roman Pounds, by just 10 Ounces.

Now, this adjustment of the Talent to Roman Pounds, was probably occasioned by the Greeks attempting to impose light weights upon the Romans, who finding the Talent to exceed 79 Pounds, might take what it wanted of 80 in their own favour, to punish the Greeks for their unfair dealing. Or, the standard the Romans pitched upon for the Euboic Talent might be somewhat over-weight; and the Coin of Lyfimachus above-mentioned, makes this conjecture not improbable; for that in the possession of Mr. Duane weighs 537,6 Troy grains, which divided by 8 gives a Drachm of 67,2, exactly the weight required by this treaty, supposing the Denarius to weigh 60 grains. But the gold coins of Philip and Alexander are so perfect, and so correctly sized, that their authority is indisputable; and if the mean Drachm of $66\frac{1}{2}$ grains derived from them were somewhat too small, it cannot be increased by above a quarter of a grain.

Therefore, I suppose the great weight given to the Talent by this Treaty, may arise, partly from too heavy a standard, and partly from the Romans taking the turn of the scale in their own favour.

After the Romans became masters of Greece and Asia, the Athenians might find it their interest to lower their Drachm to the weight of the Denarius,

rius, long before they were reduced into the form of a Roman Province, by Vespasian. When they did this, and whether they did it gradually, as may seem probable from some Tetradrachms now remaining, is uncertain ; but that they did so, sooner or later, cannot be doubted.

Pliny and Scribonius Largus expressly say, the Attic Drachm was equal in weight to the Denarius (8): and A. Gellius, who, having resided long at Athens, could not be ignorant of the value of the current money of that city, says 10000 Drachms were in Roman money, so many Denarii (9). And the Attic gold coin above-mentioned, in the British Museum, is a proof of their having reduced their money to the Roman standard.

These are the most authentic testimonies that the two Coins ever were equal ; for though all the Greek writers of Roman affairs, call the Denarius, Drachma, it is no proof of their equality ; for one being the current coin of Rome, as the other was of Athens, and not very unequal in value, a Greek might consider the Denarius, as the Drachma of Rome, and translate it by that word, which was familiar to his countrymen ; as we call the French Ecû, or the Roman Scudo, a Crown ; which hath no more affinity to the French or Italian names, either in sound or signification, than Drachma hath to Denarius.

(8) Pliny, Nat. Hist. at the end of L. XXI. Scr. Largus, in his Preface.

(9) A. Gellius, L. I. c. 8. Hoc facit nummi nostratis Denarium decem millia.

But the opinion that the ancient Attic Drachm was really equal to the Denarius, hath occasioned much confusion in the writers on this subject. Hence it is, that Rhemnius Fannius hath told us of an Attic Libra, or Mina (for he calls it by both names) of 75 Drachms; for the Roman Pound being reckoned to weigh 75 ancient Attic Drachms, Fannius, supposing them to be equal to so many Denarii, concluded it must be an Attic weight, as it could not, on such supposition be the Roman Pound.

An anonymous fragment says, *The Attic Mina weighs 12 Ounces, the other 16* (1): the former was the Roman Pound; the latter, the ancient Attic Mina. Which makes it probable, that when the Athenians reduced their money to the Roman standard, they adopted the Roman Weights; and this may have occasioned many mistakes in the later writers.

The great disproportion between the copper and silver money, when the Romans first coined the latter, hath induced many to believe that the first Denarii must have been heavier than the eighty-fourth part of their Pound; thinking it incredible that silver should ever be valued at 840 times its weight of copper. But they can produce no ancient author of credit, in support of this opinion.

On the contrary, Dionysius of Halicarnassus, who made diligent enquiry into the antiquities of Rome, while all, or most of the evidences relating to them were in being, giving an account of the first insti-

(1.) See the Appendix to Stephens's Greek Thesaurus, vol. 219.

tution of the Classes by Servius Tullius, hath valued what the Romans called *centum millia æris*, or 100000 Pounds weight of copper, no higher than 100 Minas (2), which is at the rate of a Drachm for every 10 Pounds of copper; and this valuation he must have taken from the price of copper when the Romans first coined silver, reckoning the Denarius of that time equal to what it was when he wrote. But had the first Denarius been Didrachmal or Tetradrachmal, so well-informed a writer must have known it, and would have valued the copper money accordingly. Neither is it probable that Pliny, who hath given so particular an account of the diminution of the *As*, should omit that of the Denarius.

But it is not impossible that silver might be so scarce at Rome when it was first coined there, as to bear the above-mentioned proportion to copper; and the Romans, not being a trading people, might have no regard to its value elsewhere. It is likewise probable, that, through ignorance and inexperience in money matters, they set too high a value on it at first; which seems to have been the case, by its quick reduction from 840 times its weight in copper, to 140, in less than thirty years; and again to 112 in between twenty and thirty years more; and not very long after to 56, at which price it remained during the continuance of the republican government.

But we are little interested in the weight of the Denarius for the first sixty years after it was coined; and I have shewn that when the Romans began to

(2) Compare Dionysius with Livy.

coin gold, it did not exceed the eighty-fourth part of their Pound.

The learned have differed much concerning the grammatical construction and use of the word *Pondo*; most of them have supposed it to be a neuter indeclinable; but Gronovius hath produced many authorities to shew that it was the old ablative case of *Pondus*, *pondi*, for which they afterward used *Pondere*. Livy has, *Coronam auream libram pondo*, and the like in many places. Columella, *medicaminis pondo unciam*. Celsus, *pondo denariorum trium*. And Plautus in *Menæchmis*, *Pondo duum nummum*. In all which *pondo* seems to be the ablative case for *pondere*. And Festus tells us, *Centenas pondo dicebant antiqui, referentes ad libras* (3). Thus Livy says, *sex millia pondo*, for, *sex millia librarum pondere*, and *Pondo bina & selibras*, for, *Pondere bina librarum pondera & selibras*. In the former of these passages, Livy seems to have valued the *Libra* at 100 *Denarii*. For relating how Scipio was accused of having received a bribe from Antiochus of *sex millia pondo auri, quadringenta octoginta argenti*, he calls it in a round sum *Ducenties quadragies*, or 24000 *Sestertia* (4). Now reckoning 100 *Denarii* to the *Libra*, and the value of gold decuple that of silver, it should amount to 24192 *Sestertia*; whereas reckoning 84 *Denarii* to the *Libra*, it would amount to no more than 20352. And Plutarch in his *Life of Fabius*, translates what Livy calls *Pondo bina & selibras*, by 250 *Drachms*, which is a *Sestertium*.

(3) Gronovius, *De pec. vet.* L. I. c. 6.

(4) Livy, L. XXXVIII. § 55.

The learned Budæus, and others after him, have called this sum of 100 Denarii, *Libra centenaria*, and *Libra nummaria*; though he confesses he had never found either the word *Libra* or *Pondo* used to signify a sum of money; but always, when applied to gold or silver, a weight of Plate or Bullion; and how the *Libra*, which certainly weighed but 84 Denarii when Livy wrote, should be valued at 100, is a paradox I cannot account for.